ESTABLISHED IN 1872

PAPER TRADE JOURNAL

PAPER

SIXTY-FOURTH YEAR

PAPER

Established Feb. 17, 1899
Consolidated Nov. 16, 1899
with PAPER TRADE JOURNAL.

Vol. CII, No. 9 Thursday, February 27, 1936

Established Sept. 21, 1910
Consolidated Feb. 19, 1925
with PAPER TRADE JOURNAL.

Wisconsin Paper Mills Look for Greater Output

Logging Operations Indicate Increased Production of Paper—Cutting Now at Pre-Depression Level of 1929—Heavy Demand for Pulpwood Responsible for Higher Prices Prevailing —Movement of Wood to Railroads Handled With More Speed and Convenience— Inclement Weather Retards Deliveries of Raw Materials to Mills

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 24, 1936—An indication that the paper mills look forward to increased production and continued improvement is shown in the logging operations this winter in Northern Wisconsin and the upper peninsula of Michigan. Cutting is described as being at the pre-depression level of 1929 for the first time, with more than 100,000,000 board feet going out of the Michigan woods alone.

Heavy demand apparently has been responsible for an increase in prices of pulpwood, bringing in addition a much larger cut to take advantage of the market. Contracts have been let in some sections for spruce pulpwood for $8 a cord, compared with $7.50 last year. Balsam is bringing $6 this year, compared with $5.25 a year ago. Lumberjacks are enjoying larger wages as a result.

Deliveries Fall Behind

Paper mills in Wisconsin fell behind last week on deliveries, and some almost faced shutdowns when traffic was at a standstill because of heavy snowstorms and high winds. Trains did not move for days at a time, and truck traffic on highways was impossible. The situation was aggravated by temperatures of 20 to 30 degrees below zero.

These factors tied up deliveries of coal, chemicals, pulp and other raw materials, but shutdowns were avoided by the co-operation of railroads in locating essential shipments, and giving them special dispatch as soon as trains were able to move. One needed car of chemicals for the Kimberly-Clark Corporation was delivered to Appleton, Wis., by a passenger train, and dispatched to the Kimberly, Wis., mill by a specially chartered engine. Hundreds of cars of materials were marooned at junctions and terminals, as well as trainloads of paper bound for the markets. Mills also experienced much difficulty in obtaining empty cars for the loading of shipments.

Moderation of weather for several days last week brought about a general unscrambling, and conditions appeared to be practically back to normal.

Northern Paper Mills Control

Parts of the injuctional order issued on February 13 by Federal Judge F. A. Geiger restraining directors of the Northern Paper Mills, Green Bay, Wis., and other individuals from interfering with the effort of George C. Newton, Iron Mountain, Mich., to gain control of the Northern stock as a means of reorganizing the Patten Paper Company, Ltd., Appleton, Wis., were stayed by Federal Judge Evan A. Evans, of the United States Circuit Court of Appeals, in Chicago, last week. The stay was granted pending completion of an appeal from Judge Geiger's order.

The court required the Northern Paper Mills to file a bond of $10,000 conditioned for payment of damages which might be suffered by the Patten Paper Company by reason of the stay.

Appeal from Judge Geiger's order was taken by the Northern Paper Mills and the following directors: A. B. Weissenborn, F. J. Harwood, R. H. Purdy, Earle Murray, W. P. Wagner, A. F. Tuttle, G. E. Buchanan, H. W. Tuttrup and Estella M. Goodman.

The stay was granted from Judge Geiger's order requiring certain of the Northern directors to turn over and deposit their stock; the order setting aside the sale of 3,850 shares of stock, and the order that 10,850 shares of stock be turned to Paul V. Cary as trustee for the Pattern Paper Company. Judge Evans also stayed the order restraining directors from negotiating for or making purchases of stock.

The court also ordered that during the continuance of the stay none of the appellants may transfer or attempt to transfer any of the stock affected by Judge Geiger's order to any other person, or attempt to dispose of it in any manner, and that the stay must not interfere with the efforts of Mr. Cary and others to complete their contract with Mr. Newton for the acquisition of Northern stock.

The outcome of the appeal has importance, because of the annual meeting of Northern stockholders in April, at which time the election of the board of directors will hinge on who has control of the company.

Frank J. Harwood Honored

One hundred fifty employees of Appleton Woolen Mills, Appleton, Wis., tendered a complimentary banquet to their president, Frank J. Harwood at Hotel Northern.

(Continued on page 15)

Demand for Paper Relatively Quiet in Chicago

Position of Fine Paper Section Practically Unchanged—Sulphite Bonds Less Active Than of Late—Kraft Wrapping Paper and Ground Wood Papers Fairly Steady—Newsprint Exhibits Strong Undertone—Waste Paper Prices Firmer, Due to Retarded Collections

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., February 24, 1936—The extreme cold weather and snow has had the effect of materially strengthening waste paper prices in this area, according to reports, which evidence a scarcity of folded news in particular, due to difficulty of collecting this grade of waste. Kraft waste continues to reflect the condition of the general kraft market, while other grades are uniformly strong.

Waste paper prices as paid by Chicago dealers continue to remain firm, with heavy book stock reported at .55 to .60 cents; white blank news, .75 to .85 cents; light book, .30 to .40 cents and number 1 white soft shavings $1.00 to $1.25. No. 1 mixed papers were quoted at .25 to .30 cents. Prices paid by mills f.o.b. Chicago at tonnage rates showed $7.50 a ton for No. 1 mixed, $9.50 for news and $4.00 for No. 1 soft white shavings.

The local paper market has been relatively quiet, with krafts and groundwoods reported as being in perhaps the most advantageous position. Bonds and ledgers remained little changed with some evidence of hesitation in sulphite bonds reported. Books and covers showed some improvement, though relative quiet in general business had some effect. Newsprint representatives here looked for continued strength in this market, while paper board was reported as in fair shape.

There seems to be a measure of confusion between the buyers of newsprint and the suppliers as far as the Chicago market is concerned. The Inland Daily Press Association met in Chicago during the past week, the meeting bringing newspaper publishers from all parts of the Middle West to discuss publishers problems.

One of the committees to report was that covering the newsprint situation and headed by E. P. Adler, publisher of the Davenport, Iowa, *Times*. Publishers have reported that committee's statement to read that no higher prices are expected in newsprint during 1936 and that, on the contrary, "there are rumors of recession."

The report pointed out that prices were up about a dollar a ton for the past year, but added little fear of a greater increase. This report was given on the same day the Canadian newsprint mills were talking about a possible rise—perhaps not until early in 1937—in the price, according to the local press, and when local newsprint market students were feeling better about the fundamental strengthening of the market.

Perhaps, as one Chicago newsprint representative puts it, "Mr. Adler's reported statement may indicate that the wish is father of the thought."

T. H. Ireland's New Post

A gentleman very well known to the paper industry, and particularly to the mill superintendents, has recently been placed in charge of the new department created by Crane & Co., nationally known manufacturers of plumbing supplies. This gentleman, T. H. Ireland, will direct the work of the industrial sales department which, among other things, will supply valves, fittings, etc., to the pulp and paper industry. Mr. Ireland recently moved to Chicago from New York where, for the past twelve years, he has been in the New York office. He became identified with the Crane organization in 1910, serving in the engineering department. Mr. Ireland is a faithful member of TAPPI and a most familiar figure at various meetings of mill superintendents.

News of the Industry

Paper suppliers to the Chicago printing trade should find local printers in a much better mood—and, incidentally, in a better position to purchase paper—since the court decision which removes printers from that classification which pays the 3 per cent sales tax to the State. Through the Chicago Graphic Arts Federation this favorable decision was reached after months of legal preparation and presentation. The savings means about $15,000 monthly to members and, of course, a great deal more to the entire industry in this area. If appeal is not made by the State to a higher court, then the money, now being held in escrow, will, it is reported, be refunded to the industry.

Two Chicago executives identified with the paper trade and well known in the traffic world as well, have been selected to fill important offices for the Traffic Club of Chicago during the forthcoming year. R. W. Campbell, manager of the traffic department of the Butler Corporation and currently third vice-president of the Club, has been nominated for second vice-president. Included in the directors whose terms will carry over through 1937 is J. E. Bryan, traffic manager of the Wisconsin Paper and Pulp Manufacturers' Association.

The LaSalle Paper Company, Moses Paper Company and Chicago Paper Company have recently been appointed distributors in the Chicago territory for the new Meade product known as "Moistrite Bond." The new paper is described as air conditioned and comes in a moisture-proof package. Thus practical and merchandising value are reported as combined in the new product.

The American Paper Goods Company, with factories in both Chicago and Connecticut, recently introduced a new series of ice cream and food containers in response to popular demand from the trade. The new line, to be known as "Puritan Packs," will be added to the Puritan Soda Size and Water Size containers. The "Pack" is a single wrap construction product with a specially treated paper base.

The Southern Railway has advised its intention to publish a rate of 20½ cents on imported wood pulp in 80,000 pound carloads from gulf and southern Atlantic ports to Cincinnati, according to local traffic experts. A similar proposal is reported to have already failed to secure approval from the Southern Ports Foreign Freight Committee.

Rolland Paper Profits Up

MONTREAL, Que., February 24, 1936—The Rolland Paper Company's statement for 1935 shows total operating profit and other income of $382,462 for the year ended December 31, 1935. This compares with $354,141 for the previous year. Deduction of bond interest, $123,544; depreciation, $100,000; provision for income taxes, $23,912, and directors' fees, $693; left net profit for the year of $134,313, compared with $109,094 for the preceding period.

The year's surplus, after payment of the 6 per cent preferred dividend of $90,000, amounted to $44,313. Total earned surplus as at December 31, 1935, was $371,559, as against $332,319 at the end of 1934.

Paper Demand Moderately Active In Boston

Severe Weather and Heavy Snow Falls Interfere With Deliveries of Paper—Request for Printing Papers Listless—Box Board Industry Rather Quiet—Paper Stock Continues Buoyant—Quotations on Mixed Paper Higher—Domestic Rags Moving In Good Volume

[FROM OUR REGULAR CORRESPONDENT]

BOSTON, Mass., February 24, 1936 — Business among Boston paper wholesalers was fair during the last two weeks. The severe cold weather and heavy snows interfered with trade considerably. The weather also delayed shipping in the paper industry as well as all other lines. A good representation attended the convention in New York last week. The box board market was rather quiet. At a large house, it was stated that salesmen calling on the printing trade found the demand rather poor.

Paper stock continued active. Old papers generally moved very well, although weather conditions prevented collections of mixed papers to any extent. The resultant scarcity advanced the price of mixed papers, which went up to .25 @ .35 from .22½ @ .35. In some quarters, a price of .25 @ .27½ was quoted; in others, .30 @ .35. Old newspapers remained at the same levels, .27½ @ .30. No. 1 kraft advanced to 1.20 @ 1.30 from 1.15 @ 1.30. Corrugated boxes rose to .45 @ .50 from .40 @ .45 and kraft corrugated boxes to 1.00 @ 1.10 from .95 @ 1.00. Bagging moved very briskly until buyers were supplied It is reported that buyers are trying to depress the price, with not much success as yet.

Foreign manila rope rose to 2.40 @ 2.55 from 2.40 @ 2.50, although foreign gunny No. 1 declined to 2.00 @ 2.20 from 2.15 @ 2.25 and domestic gunny No. 1 to 1.90 @ 2.00 from 1.90 to 2.10. Foreign scrap burlap went down to 1.90 @ 2.00 from 2.20 @ 2.35 and domestic scrap burlap to 1.75 @ 1.90 from 1.90 @ 2.10. It is expected that there will be a rebound in the market, with prices advancing as high and higher than before.

New domestic rags moved at a good rate, values holding firm at the same levels. As in mixed papers, collections of roofing rags were difficult, on account of weather conditions, with practically all of the eastern half of the United States snowbound. Consequently, prices of roofing rags advanced rapidly. Roofing stock No. 1 rose to 2.00 @ 2.05 from 1.70 @ 1.80; No. 2 to 1.80 @ 1.90 from 1.50 @ 1.60; and No. 3 to 1.50 @ 1.60 from 1.20 @ 1.25. Two's and blues advanced to 1.75 @ 2.25 from 1.50 @ 2.00 and black stockings to 3.90 @ 4.00 from 2.50 @ 3.00. Foreign rags are being imported to some extent. Dark cottons advanced to 1.90 @ 2.15 from 1.85 @ 1.90.

News of the Industry

At a sales meeting, held at the office of Carter Rice & Co., Corp., February 8, Richard Testut, Boston manager of the Scott Paper Company, Chester, Pa., spoke, and William Brune of the latter concern, gave a very enlightening and interesting talk on the company's products. Streeter L. Bush, assistant sales manager of the wrapping paper department of the Carter Rice Company, presided.

Knight, Allen & Clark, Inc., are now carrying Mirador Manifold, a line made by C. A. Hubbard, Kalamazoo, Mich. Mirador Manifold is a sheet for transparent work, such as sales books for pencil carbon, has a highest degree of transparency, cleanliness and fine closing. It lies flat and can be relied upon to perform satisfactorily on the printing press. The line is carried in stock in eight-pound substance and all regular sizes.

E. Summerfield Eney, of the Champion Paper and Fibre Company, Hamilton, Ohio, is to be the speaker at a meeting of the Boston Club of Printing House Craftsmen in the Hotel Kenmore this evening. Today, Tuesday and Wednesday, Mr. Eney will be calling on the trade with the salesmen of the Andrews Paper Company.

Joseph D. Snell, treasurer of the Von Olker-Snell Paper Company, was so unfortunate as to slip on the ice and break a shoulder-bone, so that he is confined to the house for a few days.

Harry H. Rutter, treasurer of Rutter & McNaught, Inc., will leave Saturday, February 28, for a six weeks visit in Miami, Fla.

Ernest C. Calkin, mill agent, has returned from a business trip to New York.

Harry Posner, of the Worcester Paper Box Corporation, Medford, Mass., has gone to Florida for a few weeks, accompanied by Mrs. Posner.

Small Capacity Positive Displacement Pump

There has long been a great need for a small pump to handle fluids at a relatively high pressure and at the same time in small quantities. To fill the gap that exists between the mechanical lubricator type and the rotary centrifugal type, the Homestead Valve Manufacturing Company of Coraopolis, Pa., has developed the pump shown—a miniature triplex plunger reciprocating pump.

Depending upon the speed of the pump the capacity may be varied from about 15 to 120 gallons per hour. The power required by the pump is small, such that a ¼ horse power electric motor will operate the pump at 60 gallons per hour capacity and 200 pounds pressure. It is a single acting plunger type having three cylinders of ¾ inch bore and ⅝ inch stroke with the plungers attached to cross-head guides which are driven by connecting rods from the crank shaft. The monel metal inlet valves are of the poppet type, positively actuated through a cam and tappet mechanism and the outlet check valves are of the ball type with adjustable limited lift for high-speed operation. The gears, crank shaft, connecting rods and cross-heads are entirely enclosed in a crank case with splash lubrication. The crank case is made of semi-steel. The cylinder head is made of a corrosion-resisting iron alloy and is removable from the crank case effecting economical maintenance.

This pump has a wide application because of the low horse power required (1/6 to ½), the wide range of pressure (0 to 500 pounds), and the positive displacement feature (high volumetric efficiency). Pure water, water containing various percentages of alkaline compounds, fuel oils, mineral oils and various chemicals are most readily handled by this pump. It is adaptable to a great variety of uses such as boiler feed, boiler compound injection, condensate returns, small hydraulic presses, fuel oil pumps for oil burners, pumping of chemicals, air conditioning apparatus and control apparatus.

The Homestead Valve Manufacturing Company will be glad to consider the application of this pump to any specific use. Prices and further detailed information will be furnished on request.

Demand for Paper Normal In Philadelphia

Trend of Paper Business Upward, With Usual Pick-Up Anticipated In Early Spring—Harsh Weather Conditions Affect Volume of Sales Temporarily and Slow Down Deliveries—Delegates From Quaker City Houses Present Reports of Recent National Convention

[FROM OUR REGULAR CORRESPONDENT]

PHILADELPHIA, Pa., February 24, 1936—The harsh weather conditions of the past weeks have naturally affected the volume of trade in the paper industry here, and have brought a slowing down in deliveries which otherwise have interfered with the normal flow of business, but aside from these purely seasonal set-backs the general trend of business sentiment is still upward; however, all eyes are turned on the prospects for a pick-up in the early Spring.

Association Activities

A meeting of the Fine Paper Division will be held at the headquarters of the Paper Trade Association of Philadelphia on Thursday of this week at 3 o'clock. Ormand Freile will preside. Norbert A. Considine, delegate of the association, will make his report on the National Convention.

In the evening of the same day, the Wrapping Paper Division will meet at Bookbinders' Restaurant for dinner at 6 o'clock. T. H. B. Smythe will preside, and Nathaniel Saxe as delegate for this Division, will make his report on the National Convention.

The Paper Trade Association of Philadelphia was well represented at the annual convention of the National Paper Trade Association held in New York last week. Notably present at the various sessions were: Norbert A. Considine, president of the Paper House of Pennsylvania and president of the Paper Trade Association of Philadelphia; T. H. B. Smythe, president of J. L. N. Smythe Company; Charles McDowell, of McDowell Paper Mills; Joseph Miller, vice-president of Garrett-Buchanan Company; William S. Willcox, of Willcox-Walter-Furlong; Nathaniel Saxe; W. B. Killhour, Jr., president of Quaker City Paper Company; Joseph S. Weaver, vice-president of Garrett-Buchanan Company; George Ward, his son David, and H. F. Johnson, of the D. L. Ward Company; Charles Papst, of Paper House of Pennsylvania; E. W. Hartung, of A. Hartung Company; Henry A. Clair, of Progressive Paper Company; Fred. Hastings, of American Writing Paper Company; LeRoy Bishop, of Raymond McNutt; Ormand Freile, vice-president and sales manager of Paper Merchants, Inc.; Simon Walter, president of Simon Walter, Inc., and Harry Lefkowith, of the same company.

Norbert A. Considine read a very timely paper on the Census of Business at the General Sessions held in the Jade Room of the Waldorf-Astoria. The highlights of Mr. Considine's address were in keeping with the program of the Department of Commerce Business Census Branch at 2401 Chestnut street, Philadelphia, under the direction of Dr. Vergil D. Reed, which was epitomized by Mr. Considine to cover the salient features as they apply to the paper trade in this section specifically. Mr. Considine stressed the necessity for members sending in statistics promptly in order that detailed information concerning the activities of the trade may be made available as soon as possible.

W. B. Killhour, Jr., president of Quaker City Paper Company, and chairman of the National Survey Committee, reported on the activities of this committee throughout the year.

Among those in attendance at the dinner on Wednesday evening, for presidents, secretaries and treasurers were Mrs. Doris E. Lewis, executive secretary of the Paper Trade Association of Philadelphia, Norbert A. Considine, president, and LeRoy Bishop, treasurer.

News of the Industry

The following is a letter sent out last week to all the members of the Paper Trade Association of Philadelphia:

"As announced at the last meeting of the Fine Paper Division, a joint get-together luncheon between both Fine and Wrapping Divisions of the Paper Trade Association of Philadelphia, and the Philadelphia Paper and Cordage Association has been scheduled for Friday, February 28, at the Hotel Adelphia with luncheon at 12:30 sharp.

"We are indebted to the Paper and Cordage Group for their invitation to this luncheon. The real purpose behind the whole movement is to create a better contact between all people interested in the paper industry in Philadelphia. It is our express desire that as many as possible from each house attend—the invitation includes employes as well as executives.

"On the program is a speaker of particular interest, Joseph J. Alexander, Philadelphia manager of Dun & Bradstreet, Inc., who will talk on 'Business Prospects for 1936' and who is qualified to speak with considerable authority and experience, as representing the greatest factor in the business world so far as definite knowledge of conditions is concerned. We believe it will be well worth your while to attend."

William S. Willcox, of Willcox-Walter-Furlong, accompanied by Mrs. Willcox, sailed February 22 on the steamship *Corinthian* for Nassau, where they will remain until March 9.

T. H. B. Smythe, of H. L. N. Smythe, is confined to his home, suffering from an attack of grippe.

Robert Gair Co. Nets 46 Cents Per Share

Report of Robert Gair Company, Inc., and subsidiaries for year ended December 31, 1935, certified by independent auditors, shows net profit of $820,448 after depreciation, interest on bonds of subsidiary company, interest on income notes and federal taxes, equivalent after annual dividend requirements on 185,592 shares of $3 preferred stock, to 46 cents a share on 574,613 shares of common stock, excluding 387 shares held in treasury. This compares with $935,422 or 67 cents a share on 563,664 common shares, excluding 11,336 treasury shares, in 1934.

E. B. Friedlander Re-Nominated

The nominating committee, charged with the responsibility of selecting a candidate as president of the National Association of Waste Material Dealers, Inc., for its 24th year have unanimously decided to re-nominate Edward B. Friedlander, of the Loewenthal Company, Chicago, for a second term.

Mr. Friedlander was first elected president at the convention last March held in Chicago.

WISCONSIN PAPER MILLS LOOK FOR GREATER OUTPUT

(Continued from page 11)

Appleton, recently. The occasion marks his sixtieth year as a resident of Appleton, and the completion of fifty-five years in the management of the concern. He was presented with a plaque and a hand-engraved book. A. H. Thuerer acted as toastmaster, and A. H. Wickesberg presented the gifts. Mr. Harwood also is a director of the Northern Paper Mills.

Personnel Changes

Changes of personnel were announced in several quarters last week.

Emil J. Hansen, assistant sales manager of the Northern Paper Mills, Green Bay, Wis., resigned to accept a position as sales manager of the Wisconsin Tissue Mills, Menasha, Wis. He assumed his new duties February 24. He had been with the Northern company for the last nine years.

Neil E. Nash has been named assistant general sales manager of the Nekoosa-Edwards Paper Company, Nekoosa, Wis. He succeeds Adam C. Remley, who recently become general sales manager. Mr. Nash has been associated with the company's Chicago office, having charge of all wrapping paper sales out of that office. He will now be sales manager of the wrapping division, and will continue to reside in Chicago.

Elbert Held, of Milwaukee, Wis., has been elected a director of the Eddy Paper Company, of which the Kieckhefer Container Corporation of Milwaukee, is a part. He succeeds L. R. Edwards, resigned. W. F. Kieckhefer, Milwaukee, continues in the post of secretary-treasurer, to which he was elected last fall.

Loan to Thilmany Approved

A loan of $40,000 to the Thilmany Pulp and Paper Company, Kaukauna, Wis., by the City of Kaukauna to assist in the financing of a new bleach plant and additional beater room has been given approval by the council. The payment of this sum hinges on the legal ability of the city to make industrial loans out of municipal funds, and the officials are in conference with the Wisconsin Public Service Commission as to the arrangements. The city plans to make the loan from the surplus fund of its municipally owned electrical utility.

Forest Products Appropriation

An appeal has been made to the appropriations agricultural sub-committee of the House of Representatives to disregard the recommendation of the director of the budget for $608,000 as the annual appropriation for the United States Forest Products Laboratory at Madison, Wis. Wisconsin Progressives, headed by Congressman Gerald Boileau, of Wausau, have pointed out that $1,000,000 is needed. They contend the federal government ought to be looking for new ways to utilize wood products, with many millions being spent each year for reserving and replanting national forests. The laboratory received $500,000 last year, but was allocated additional funds from emergency departments.

News of the Industry

An amendment to the articles of incorporation of the Riverside Paper Corporation, Appleton, Wis., have been filed with the secretary of state at Madison, Wis. It reduces the board of directors from five to three members. The amendment is signed by C. B. Clark, president, and E. C. Hilfert, secretary.

Foremen of the two mills of the Fox River Company, Appleton, Wis., were entertained by the company at a dinner at Conway hotel. About forty men were present. Motion pictures of paper mills and mill equipment were shown. A cable of greeting was read from William C., Wing, president of the company, who is in Honolulu.

Personnel managers of Wisconsin paper mills held a dinner at Hotel Northern, Appleton, Wis., last week to discuss problems. The speaker was W. W. Hield, of Green Bay, Wis., manager of the Sixteenth District of the Wisconsin State Employment Service. His subject was "Ways and Means of Mutual Co-operation."

Bert E. Roberts, of the electrical department of the Thilmany Pulp and Paper Company, Kaukauna, Wis., has announced his candidacy for Mayor of the city. He has been an alderman for several years.

A. P. Woodson, president of the Mosinee Paper Mills Company, Mosinee, Wis., in company with J. D. Mylrea, Rhinelander, Wis.; R. G. Brownell, Williamsport, Pa., and Frank Handeysdie, Rib Lake, Wis., have purchased the Rib Lake Lumber Company, with a large mill at Rib Lake, and extensive timber holdings in Taylor, Price and Lincoln counties of Wisconsin. A new corporation is being set up, of which Mr. Woodson is expected to be president. Plans are to build additional logging spurs and extend operations.

Heads Cincinnati Cordage & Paper Co.

[FROM OUR REGULAR CORRESPONDENT]

DAYTON, Ohio, February 24, 1936—A. T. Nesbitt, of this city, who has been identified with the Cincinnati Cordage and Paper Company for 44 years, having joined the company soon after its founding in 1892, has just been elected president of the concern, action being taken at the last meeting of the board of directors in Cincinnati during the past week.

Mr. Nesbitt has been vice-president and general manager, but will now direct the affairs of the company from this city, for the present at least. Whether he will be located later in Cincinnati remains to be seen.

Mr. Nesbitt's son, Don, who has been a salesman for the Dayton house of the Cincinnati Cordage and Paper Company for a number of years, was elected a member of the board of directors.

The Senior Nesbitt was vice-president of the Cincinnati company since 1902, and was general manager of the Dayton branch, which occupies commodious quarters on East Third Street, since he founded the house in 1913, the year of the Dayton flood.

The Cincinnati Cordage and Paper Company, of which the Daytonian now is the head, following his long and active association with it, distributes the products of leading paper and twine manufacturers of the United States and has 28 representatives covering eight states.

Mr. Nesbitt has been an important factor in civic work in Dayton for many years. He has been active each year in the Community Chest campaign, is vice-chairman of the Masonic Temple Fund Committee and chairman of the building fund committee of Grace Methodist Episcopal church.

He has been active in Y. M. C. A. work, having served on the board of directors of this institution. He also has been a member of the directorate of the Miami Valley hospital, the Chamber of Commerce and the Boy Scouts executive committee.

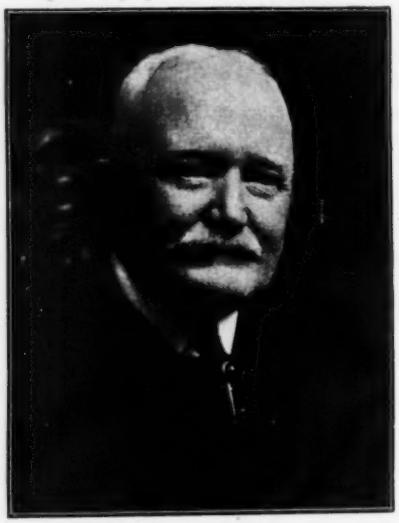
Obituary

Patrick J. Kelly

Patrick J. Kelly, founder and for many years head of the present firm of Kelly & Co., Inc., Newark, N. J., died Sunday morning, February 16, at the age of 84 years, following an illness of about a year.

Mr. Kelly was a real pioneer in the Waste Material Industry in which he spent his entire business career extending over a great many years.

The origin of Kelly & Co., Inc., dates back to 1855 when it was started by Mr. Kelly's father. While still a young man, Patrick J. Kelly joined his father in business, the



PATRICK J. KELLY

firm at that time being known at William Kelly and Son, and was located at 66-68 Sheriff Street, New York City.

Mr. Kelly took pride in the fact that his advertisement was in the first issue of the PAPER TRADE JOURNAL, a copy of which he had framed and hung in his office. This paper bears the date of May 27, 1872.

The fact that this goes back sixty-four years is something to be proud of, especially as the business has been carried on and is still going strong.

In 1903 Patrick J. Kelly moved his business to Newark, the firm name being changed at that time to Kelly & Co., Inc., Newark, N. J., where the business has been carried on ever since.

Mr. Kelly had resided in East Orange, N. J., for the past thirty years. He is survived by three sons, William P., Daniel W., and Edward C. Kelly, all of whom are connected with Kelly & Co., Inc., and four daughters.

Mr. Kelly retired from all business activities about five years ago since which time the business has been conducted by William P. Kelly and his brothers.

Leslie C. Bartlett

PHILADELPHIA, Pa., February 24, 1936—The passing of Leslie C. Bartlett on Friday last came as a shock to all of those who were privileged to know this estimable gentleman. Mr. Bartlett was president of the Eastern Paper Company, with headquarters at 401 North Broad street. The Eastern Paper Company was established upwards of twenty years ago by Charles J. Bartlett, for many years representatives of the Judd Paper Company.

Mr. Bartlett served in the World War, enlisting in the West, and after the War he was very active in the paper business, having associated himself with his father, Charles J. Bartlett. The members of the Paper and Cordage Association can attest to his indefatigable services in the activities of the association, and as President George K. Hooper says—"Leslie Bartlett typified the principles and laudatory work of the association. Just this last Christmas when the association was host, as is its custom each year, to upwards of fifty children recruited from the ranks of the Salvation Army, Mr. Bartlett, although incapacitated by reasons of illness, sent in his donation of ten dollars towards clothing and entertainment for these little charges."

Mr. Bartlett was 48 years of age. He was a member of the American Legion and the Board of Governors of Tavistock Country Club, and was well known at Sea Isle City where he had a summer residence.

To his widow, Mrs. Mary C. and his daughter Jane, deepest sympathy is extended by all his friends in the trade.

Mr. Bartlett was also a member of Hoyle Butcher Post, No. 149, A. L., of Haddon Heights, N. J. Services were held this afternoon at his late residence, 1102 South Park Avenue, Haddon Heights, and interment was made in Locustwood Cemetery.

Henry Bauer, Sr.

ATLANTA, Ga., February 22, 1936—Henry Bauer, Sr., aged 66, for more than fifty years associated with the Atlanta Paper Company, died last week at his home at 982 Virginia avenue, N. E., after a prolonged illness.

He had been secretary of the firm for nine years and was one of the most widely known paper executives of the southeast.

Though he had lived here most of his life, Mr. Bauer was a native of Germany. He was a leader in civic and religious work, being a member of the Jewish temple.

Surviving are his wife; a son, Henry Bauer, Jr.; several brothers and sisters, including Miss Addie Steinheimer, Mr. and Mrs. Walter W. Visanska, Mr. and Mrs. Morris Steinheimer, Mr. and Mrs. Milton Oelsner and Mr. and Mrs. Lawrence Steinheimer.

John Purves

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 24, 1936—John Purves, manager of the Consolidated Water Power and Paper Company's mill at Biron, Wis., died February 19 at his home at Wisconsin Rapids, Wis. He had been manager since 1923.

Mr. Purves was mechanical engineer of the Combined Locks Paper Company, Appleton, Wis., in 1915, and later became mill superintendent of the Interlake Pulp and Paper Company of Appleton, a subsidiary of Consolidated. He then spent three years with the Port Arthur Shipbuilding Company, at Port Arthur, Canada, after which he assumed management of the Biron mill.

Mr. Purves is survived by his widow. He was a member of the Congregational church, and was a thirty-second degree Mason. Burial took place at Wisconsin Rapids.

George C. Limpert

[FROM OUR REGULAR CORRESPONDENT]

APPLETON, Wis., February 24, 1936—George C. Limpert, Appleton, Wis., who was with Appleton Woolen Mills for 25 years, and with Kimberly-Clark Corporation eighteen years, died last week at his home after a short illness. He is a former assessor of the City of Appleton.

$20,000,000 Offer for Price Bros. & Co.

A newly organized company, "Pacona, Limited" of which Aime Geoffrion, K. C., famous legal light of Montreal is president, has submitted an offer to buy for cash somewhat in excess of $20,000,000 all the assets of the big newsprint and timber firm of Price Bros. & Co., now being operated under a receivership. The commitments are made, it is indicated, by Aluminum, Limited, which is largely interested in Duke-Price Power, and Lehman Brothers of New York, prominent banking firm.

The new plan contemplates paying off bondholders in full, principal as well as interest. The cash payment for principal amount of the bonds will involve a sum of $11,061,600, it is indicated, and four years' arrears of interest (as at February 1, 1936) of a sum of about $2,650,000, or a total payment to the bondholders in cash of approximately $13,700,000.

Provision is made for the discharge of all bank loans and other current liabilities incurred in the carrying on of operations by the trustee, also taxes and other indebtedness. In addition settlement will be arranged, it is stated, of the claims of the Saguenay Power Company, Limited, and a sum of money has been offered the trustee in bankruptcy that is believed to be sufficient to cover claims of the other unsecured creditors. No reference is made in the offer of Pacona, Ltd., to the position of the holders of preferred and common stock. There would seem to be no sum included in the offer for holders of such stocks and no provision appears to be made in the offer itself for any shareholders by way of bonus or subscription rights.

The association of the Aluminum interests with Price Bros. & Co., Limited (through Duke-Price Power Company, Limited) has extended over a number of years. Aluminum Limited is largely interested in the Duke-Price Power Company, Limited, which is the principal power producer in the Saguenay District. One of the chief users of Duke-Price power is Price Bros. & Co., Limited.

Some two years ago, the Duke-Price Power Company, Limited (as it was then) in association with two other groups promoted and offered to finance a scheme providing for internal reorganization of Price Brothers. This scheme (in March, 1934) was approved by the unsecured creditors and the common shareholders, but rejected by the preferred shareholders. The plan involved the provision of $5,000,000 of new money, and left the preferred shareholders with a five per cent preferred stock, while the common were to receive one-third of the new common stock. During the latter part of June, 1934, Duke-Price Power Company, Limited, promoted a second plan for refinancing Price Brothers, in association with the other two and a third group. Again approval was voted by the unsecured creditors and the common shareholders, but the plan met defeat through a second adverse vote of the preferred shareholders.

Since that time various other proposals have been reported, but no plan has been developed to the stage of the formal offer until the one just submitted by Pacona, Ltd. It is gathered that the offer, which was submitted on Thursday of last week, will be taken under consideration almost immediately by the Bondholders' Protective Committee.

Court Approves Brown Co. Plan

Judge John A. Peters in the United States District Court for Maine has approved the deposit agreement for Brown Company first mortgage bonds, series A and B, presented by the Adams committee, headed by Honorable Charles Francis Adams, chairman.

Other members of the committee are Serge Semenenko, vice chairman, Robert Braun, Sherman Damon, Edgar C. Hirst, Ernest M. Hopkins, John R. Macomber, Alfred A. Montgomery, Willard D. Rand, Lee P. Stack and Storer P. Ware. This committee has no connection with the re-recently formed committee of which Lee S. Buckingham is chairman.

The court order approved the provisions of the deposit agreement, terms and conditions of the issuance of certificates of deposit, and the solicitation and acceptance of deposits of bonds by the Adams committee.

It is expected that at an early date the Adams committee will ask for deposit of bonds. The committee is requesting that bondholders take no action with regard to their bonds until they receive notice from the committee asking for deposits.

The property of the Brown Company is being administered by the trustees appointed in the 77B proceedings October 2, 1935, by the United States District Court for the District of Maine. The trustees are the Hon. Rolland H. Spaulding, William B. Skelton and Orton B. Brown. Messrs. Spaulding and Skelton were appointed at the Adams committee's suggestion.

New Line of Worm Gear Reducers

Announcement is made by Link-Belt Company, Philadelphia, that it has developed and is now in production on a new line of cut-tooth worm gear speed reducers of simple, compact, accessible construction, offering great flexibility of driving arrangement. The new reducers are available in a wide range of ratios and capacities, with single or double reduction, and in horizontal and vertical types; all provided with precision tapered roller bearings and automatic lubrication within dust-proof gray iron housings.

The output shaft with its chilled phosphor bronze worm wheel can be located above or below the worm shaft, which is made of a low-carbon alloy-steel forging, carburized and heat-treated after the worm threads have been cut thereon. A feature of the double-reduction reducer is the unitized attachment of primary reduction unit to the side of final-reduction housing.

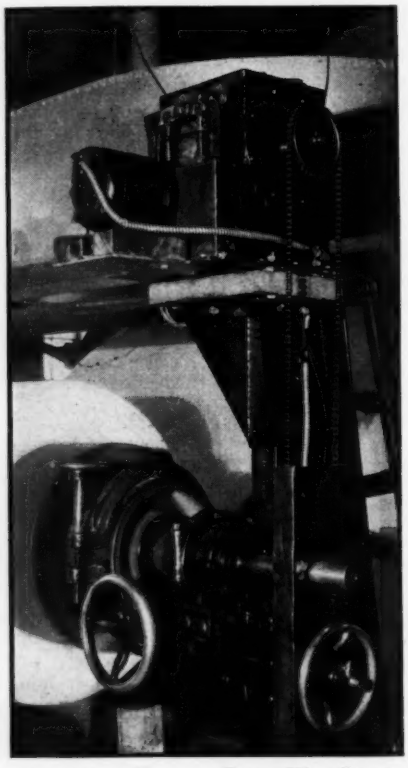
Conforming with the recently recommended practice of the American Gear Manufacturers Association, the name plate of each Link-Belt worm reducer is stamped to indicate the ratio, input and output r.p.m., the input horse power or output torque capacity, and the service factor used in determining the rating for which the unit has been sold.

A 40-page illustrated catalog, No. 1524, has been prepared, giving dimensions, service factors, A. G. M. A. horsepower ratings, and engineering data for selection of the right reducer unit. This book will be sent gratis to any reader upon request addressed to the company at 2045 W. Hunting Park avenue, Philadelphia, or nearest office.

New Fourdrinier Tube Roll Arrangement

A number of machinery builders and other gentlemen prominently connected with the paper industry recently attended a demonstration at Neenah, Wis., of a working model of the new Nash flexible tube roll arrangement. This new invention, which promises to be an important development in the Fourdrinier machine, is the work of William C. Nash, of Neenah, Wis., whose long and successful experience as a papermaker and an inventor of wire and felt guides and other paper machinery devices, has given him a prominent place in the paper manufacturing industry.

Mr. Nash's new invention has been specifically directed to reduce the speed of the table rolls on the Fourdrinier



AUTOMATIC ELECTRIC PAPER WEB GUIDE

by making them independent of the speed of the wire screen. The arrangement provides that the axes of the tube rolls may be moved at any desired rectilinear speed in the same direction of travel as the wire. Hence, if the axes of the rolls and the wire travel at identical speeds, the tube rolls do not rotate. If a difference is effected in their rate of traveling speed, such as to make the axes move slower or faster than the wire, then the rolls rotate either clockwise or counterclockwise at peripheral speeds to compensate for this difference in rectilinear speed.

Pressure and vacuum at the rolls are thereby prevented or controlled, and a better formation of the sheet is anticipated at a greater speed. Better retention of filler and more uniform sheet surface on both sides, with less wire marks and pin holes, are other results expected by the use of this arrangement.

The demonstration also included the operation of a combined automatic stretch and guide roll, intended to relieve the strain on the wire cloth. By its unique arrangement, this automatic stretch and guide roll eliminates the conventional guide roll. Thus, by elevating the couch roll to the same plane as the tube rolls, four or five feet more of wet end are available, either for additional tube rolls or suction boxes with no increase in wire length. Patent and patents pending cover the transposition of the conventional tube roll to any other position to accomplish this end.

Another demonstration witnessed by those present was the operation of an automatic electric web guide for rewinders and slitters to keep the paper web in alignment and to control the trim.

Both the automatic stretch and guide roll and the automatic electric web guide, which are new in design, are manufactured and sold by Gilbert & Nash Company, Menasha, Wis.

All of the Gilbert and Nash automatic guides are now equipped with a patented new palm suspension, of the pendulum type, that greatly reduces wear on clothing and wires.

Another interesting feature of the Gilbert & Nash exhibit was the illustration of a new, improved type of vertical felt guide, designed to allow narrower clothing to be used on the machine and keep it in perfect alignment. The old type of Gilbert & Nash horizontal felt and wire guide with a different palm suspension to increase sensitivity and lessen the wear on clothing was also exhibited.

A reorganization of the Gilbert & Nash Company recently has been effected. The new officers are: Theodore M. Gilbert, president; George Gilbert, first vice-president; William C. Nash, second vice-president, and Mrs. James W. Jones, secretary-treasurer.

A. J. Corning Heads Hubbs & Company

A. J. Corning of Baltimore was recently elected to the presidency of Hubbs & Corning Company of 404 South Eutaw Street, Baltimore, to succeed the late Charles F. Hubbs, who died on December 21, 1935 and who was one of the original founders of the business.

Mr. Corning is widely known in wrapping paper and allied industries throughout the United States as well as in Baltimore, having served on many committees, etc., in connection with the National Paper Trades Association. Mr. Corning is also the secretary, while R. C. Kettles, Jr. was elected vice-president. Herbert A. Simpson is treasurer and general manager, and J. F. Schafer is assistant secretary.

Sixth Packaging Conference and Exhibition

The American Management Association will sponsor its Sixth Packaging Conference and Exhibition at the Pennsylvania Hotel, New York, N. Y., March 3 to 6, inclusive.

This meeting will feature conference sessions, clinics, exposition displays and the Irwin D. Wolf Awards.

Among the subjects to be discussed are the following: Unit Packages—Basic Considerations, Standards for Protective Materials, Packaging Fallacies or Fetishes, Merchandizing the Package, Packaging Machinery, Packing and Shipping, Container and Packing Problems of Articles Requiring Interior Packing.

Government Paper Award

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 26, 1936—Reese & Reese, Inc., has been awarded the contract for furnishing the Government Printing Office with 2,784 pounds (19,535 sheets) of 28 x 34, 100 per cent rag salmon and blue ledger paper at 28.55 cents per pound, bids for which were received on January 31.

CONSTRUCTION NEWS

A Summary of Vital Facts Regarding Construction, Finances and Operation of Paper Mills

Construction News

Chillicothe, Ohio—The Chillicothe Paper Company, manufacturer of bond and other writing paper stocks, is considering new one-story addition to mill, comprising a number of units for different departments of production, including specialty division, storage and distribution, and other service. No estimate of cost has been announced. Proposed to begin work in near future.

Detroit, Mich.—The Minnesota Mining and Manufacturing Company, Forest street, St. Paul, Minn., manufacturer of abrasive papers and allied products, has concluded arrangements for lease of one of former plant buildings of the Studebaker Corporation on Piquette avenue, near Brush street, Detroit, on tract of about 3 acres of land, and will remodel and equip for new branch plant for one of its branches of manufacture. New mill will represent an investment of more than $50,000. W. L. McKnight is president.

Boston, Mass.—The Atlantic Paper Box Company, Inc., recently organized with capital of 500 shares of stock, no par value, will take over and succeed to the company of same name, with local plant at 46 Waltham street, specializing in production of stiff paper boxes and containers. Isaac Shulman is president of new company, and Samuel Manaster, treasurer.

Hamilton, Ohio—The Beckett Paper Company, manufacturer of bond and writing papers, has revised plans under way for new power plant at paper mill, and will ask bids on general contract in near future. Bids recently received have been rejected. Equipment installation will include a new high-pressure boiler unit and auxiliaries. New plant is reported to cost close to $200,000, with equipment. Fosdick & Hilmer, Union Trust Building, Cincinnati, Ohio, are consulting engineers.

Atlanta, Ga.—O. B. Andrews Company, Rossville avenue, Chattanooga, Tenn., manufacturer of corrugated paper boxes and containers, has acquired a building on Mechanic street, Atlanta, and is said to be arranging occupancy in near future for branch storage and distributing plant. Structure will be remodeled and improved.

New Orleans, La.—The Johns-Manville Corporation, 22 East 40th street, New York, N. Y., manufacturer of asbestos paper products, insulating board specialties, etc., has awarded general contract to the George J. Glover Company, Inc., New Orleans, La., for proposed new mill in Jefferson Parish, near New Orleans, where large tract of land has been acquired, as recently noted in these columns. Main unit will be one story, 150 x 800 feet, with number of smaller structures. Superstructure will be placed under way at early date. New plant is estimated to cost about $700,000, with equipment. George P. Rice, Barrone Building, New Orleans, is engineer. S. A. Williams is vice-president of company, in charge of mines and plants.

Lockport, N. Y.—The Shearston Box Corporation, recently organized with capital of 550 shares of stock, is said to be planning early operation of local plant for manufacture of paperboard boxes and containers, cartons, etc. New company is headed by Charles E. Shearston, 217 High street, and Herbert P. Robson, 387 High street, both Lockport.

Cleveland, Ohio—Superstructure will be placed under way at once on rebuilding of four-story structure at Wentworth and Neville avenues, recently destroyed by fire with loss over $350,000, occupied in part by the Great Lakes Box Company and Cleveland Corrugated Box Company, respectively, both manufacturers of corrugated paper boxes and containers. The two companies will resume occupancy in the new building, installing equipment for increased production. The structure is owned by the Valuation Service Company, Guardian Building, which has let general contract for reconstruction to the Bolton-Pratt Construction Company, Marion Building, Cleveland. The George S. Rider Company, Marshall Building, city, is architect and engineer.

Jersey City, N. J.—The Arvey Corporation, 612 North Michigan avenue, Chicago, Ill., manufacturer of card products of various kinds, cardboard cut-outs and allied specialties, has taken title to former plant of the American Type Founders Company, Communipaw avenue, Garrabrant and Monitor streets, Jersey City, for which purchase was recently arranged, as previously announced in these columns. Company will take over property at once and will make improvements for early occupancy for Eastern converting plant. Equipment will be installed for large capacity. The purchase includes a main two- and three-story building, on site about 250 x 860 feet, and was secured for a reported consideration of $250,000.

Middletown, Ohio—The Gardner-Richardson Company, manufacturer of paper board, box board and kindred products, has begun excavations for new addition to mill, to be used for general operations and office service. It will be two-story, estimated to cost about $45,000. General contract was recently awarded to the B. G. Danis Company, 1350 East First street, Dayton, Ohio. J. Douglas Lorenz, 330 West First street, Dayton, is architect.

Clinton, Mass.—The Fibre-Processing Company, recently organized with capital of 5,000 shares of stock, plans operation of local plant for production of fiber products. Raymond B. Roberts is president, and Harmar Morse, Lancaster, Mass., treasurer and representative.

Eden, Vt.—The Ruberoid Company, 500 Fifth avenue, New York, N. Y., manufacturer of roofing products, etc., has concluded arrangements for purchase of the Vermont Asbestos Corporation, Eden, operating a local chrysotile asbestos mine, and will use the properties for raw material supply. Acquired company will be operated as a subsidiary interest, and mines developed and equipped

for large increase in present output. The acquisition includes about 1700 acres of asbestos deposits in the Belvidere Mountain area of Lamoille County. Purchasing company operates a mill at Joliet, Ill.

New Companies

Ogdensburg, N. Y.—The Wallace Supply Company, Inc., has been incorporated with capital of $10,000, to manufacture and deal in paper boxes and containers of various kinds, cartons, folding boxes, etc. New company is headed by Franklin R. and Homer M. Wallace, both of Ogdensburg.

Detroit, Mich.—The Redford Paper Bag Company, 8545 West Jefferson avenue, has been chartered with capital of 1,000 shares of stock, no par value, to manufacture and deal in paper bags and containers. George Hovsepian, 21166 McNichols road, Detroit, is principal incorporator and representative.

Dallas, Tex.—The National Tag Company, Inc., has been organized to manufacture and deal in paper tags, cards and other paper products. New company is headed by John Nichols and Allen Melton, 302½ South Beckley street, Dallas.

Long Island City, N. Y.—The Raven Sales Company, Inc., has been incorporated with capital of $2,000, to deal in paper products of various kinds. The incorporators include Gordon F. Mesick, 91-16 Eighty-fifth avenue, and Edward M. Schmidt, 85-01 Ninety-first street, both Woodhaven, L. I.

Great Lakes Reorganization

TORONTO, Ont., February 24, 1936—At a meeting of representatives of the twenty-four publishers backing the Aldrich-Gefaell plan for the sale of the Great Lakes Paper Company, Ltd., it was unanimously agreed that the group would continue to stand together as a unit until every obstacle to consummation of the plan has been overcome.

For the purpose of co-operating more closely with the Bondholders' Committee, headed by the Rt. Hon. Senator Meighen, the publishing group by resolution appointed L. E. Aldrich, of the *Chicago Daily News,* and H. Ponting, of the *Detroit News,* with E. K. Gaylord, to act alternatively if either one of the first two named cannot act. This committee in the meantime will co-operate in settling details incident to the later assumption of title to the Great Lakes property by the new company, and after that will probably be the first directors representing publishers on the board of the new concern.

It was intimated by one of the publishers during the course of their discussion that, if the Ontario government should continue its opposition to the reorganization to the extent ultimately making it impossible for the new company to function, the publishers would be prepared to withdraw virtually all of their newsprint orders from Ontario mills and seek supplies elsewhere. They expressed the feeling that Ontario government intervention at this stage is unwarranted, and that if the will of the bondholders, who now own the property, is balked by arbitrary legislation, the co-operating publishers could well afford to withdraw their business from a province whose government is so inconsiderate of the interests of business concerns operating in the province.

It was stressed by various speakers, and agreed to by all the others, that the ten-year contracts made by publishers with the new company are not designed to keep the price of newsprint down. Apart from the consideration of receiving newsprint supplies, they made it clear that their further interest is to establish a paper mill which will not be dominated by other newsprint companies whose interest is merely to stifle competition.

In furtherance of this objective a resolution was adopted empowering John E. Gefaell to obtain additional contracts for ten-year periods, with outside publishers if necessary, so that the mill of the Great Lakes Company may operate at least at 90 per cent of capacity. In that way only, along with the maintenance of satisfactory prices, can dividends be paid out of earnings in excess of fixed charges and depreciation.

With Senator Meighen and counsel to Messrs. Aldrich and Gefaell advising them as to technicalities, the publishers made tentative plans for carrying on the campaign for complete acceptance of their offer. They considered various eventualities arising from Ontario government opposition, and were assured by Senator Meighen that means could be found to operate, even if Ontario refused to issue a license in mortmain to the new company.

A resolution also was adopted appointing the London and Western Trust Company as trustee for the publishers in accordance with the terms on which the new company is to be organized.

Pulp Resolution Indefinitely Postponed

WASHINGTON, D. C., February 26, 1936—The Borah resolution (S. Res. 195) directing the United States Tariff Commission to investigate the production costs of pulpwood or wood pulp, has been indefinitely postponed in the Senate. It came up for action the latter part of last week.

In connection with this resolution, Senator Robinson of Arkansas, majority leader made the following statement: "I am informed by the chairman of the Tariff Commission that under the law there is no authority for the investigation under a Senate resolution or House resolution of the subject matter of the proposed investigation. I am also informed that a full and complete investigation is being made by the Tariff Commission under general law, and I should like to suggest to the Senator from Idaho that if he has no objection the resolution ought to be recommitted to the committee."

Senator Borah of Idaho, who introduced the resolution said: "I think, as the Senator from Arkansas has stated, that an investigation is proceeding, which investigation by the Tariff Commission, as I understand, covers practically everything that would be covered by this resolution. I also assume that, in view of the Canadian reciprocity agreement, the information which would be acquired under the resolution would not be of any practical benefit for the next 3 years. I therefore have no objection to the resolution being indefinitely postponed."

Better Outlook for Newsprint

MONTREAL, Que., February 24, 1936—A superficial observer might well be pardoned for coming to the conclusion that so far as the newsprint industry is concerned the depression is over.

Having finished 1935 with a production exceeding that of gay '29, when the sky was the limit, Canadian mills have started off the year by beating all previous records in the way of production for the like period, and with everything to indicate that the pace will quicken as the year proceeds.

Investors—or rather speculators—are not only biting at paper securities, but naturally seeking them, and paying the increasing prices that demand stimulates.

All this is making for the real habilitation of the industry, and while the price structure remains the bugaboo that it has been for years, time and tide are working for and not against the industry.

Better times are definitely on the way, in spite of all.

YOU BOUGHT IT

WHY THROW IT AWAY?

Stock carried off in waste water has cost you real money to buy and prepare. Why let the sewer get it when it can be rescued and put back into good paper at insignificant cost? The BIRD SAVE-ALL gets the fibres out of the white water, puts both fibres and water in shape for immediate re-use and does it at lowest cost per ton of recovered stock. Let us show you how easy it is to figure the profit in your case. You may be surprised at the amount.

BIRD MACHINE COMPANY · SOUTH WALPOLE, MASSACHUSETTS

BIRD SAVE-ALL

YOU CAN MAKE MORE MONEY WITH NEW BIRD MACHINERY

6627

PAPER TRADE JOURNAL
ESTABLISHED 1872
15 West 47th St., New York, N. Y.
Henry J. Berger
Editor
Ronald G. Macdonald
Editor Technical Section
Herbert J. Laughton
Associate Editor
Thomas J. Burke, C. A.
Editor Cost Section
Lynne M. Lamm
Washington Correspondent
Price, Per Copy, 10 Cents
United States, Per Annum, $4.00
Canada, $7.50; after Jan. 1, 1936, $6.00.
Foreign Countries in Postal Union, $6.00
Member Audit Bureau of Circulations
Vol. CII New York, February 27, 1936 No. 9

FOREIGN PAPER TRADE GAINS IN 1935

Exports of paper and paper products, exclusive of printed matter, from the United States during 1935 reached a total valuation of $20,519,550, according to preliminary figures now available, according to the Forest Products Division of the Department of Commerce. This amount represents an increase of $1,644,105, or 8.7 per cent, over the preceding year and of $5,920,749, or 40.6 per cent over 1933. The result was not unexpected in view of the fact that paper exports during 1935 up to the month of August were uniformly higher in value than during the corresponding months in 1934. During August there was a decline of 5 per cent in the aggregate value of these shipments, followed in September by a further drop of 9 per cent, bringing exports for the third quarter down to the level of the corresponding three months in 1934. The value of exports again rose during the succeeding quarter, averaging 13 per cent above the amount recorded for the last three months of 1934.

The export trade in paper and paper products reached its lowest point in January 1933. Since that time allowing for seasonal fluctuations, a steady upward trend has been perceptible.

Perhaps the most outstanding feature in 1935 exports is the gains made in the higher priced groups. Exports of newsprint declined slightly last year, but this decrease was more than offset by a rise of 16 per cent in shipments of uncoated book papers. Exports of wrapping papers, exclusive of greaseproof and waterproof papers, dropped off 15 per cent, but shipments of the latter increased 25 per cent. Exports of boxboards rose 12 per cent last year, exports of bristols increased 17 per cent and other paperboards 20 per cent. Among the heaviest gains registered last year was an increase of 32 per cent in writing papers, bringing total shipments of this particular item 11 per cent above those recorded for 1930 and less than 15 per cent below the 1929 total.

Shipments of over-issue newspapers used as a substitute for wrapping papers in the Orient, dropped off 12 per cent last year. Exports of tissue paper, paper bags, envelopes, and filing folders, index cards, etc., were also slightly below the level of 1934 (less than 3 per cent in each instance but the remaining items show, in most instances, substantial increases over the preceding two years.

Except for a few items export prices seem to have touched bottom in 1933 and during the past two years have remained stable or risen slightly. Newsprint paper offers an outstanding exception, the average value of shipments of this product having declined steadily from a high of $80 per short ton in 1930 to $42 in 1934 and $38 last year. Exports of tissue and crepe papers also show a lower average value per pound, although this may be due to heavier shipments of the cheaper grades of paper. On the other hand average export values of boards, exclusive of boxboards, uncoated book papers, greaseproof and waterproof papers, and blotting papers have risen more or less steadily over the past three years.

Exports of paper base stocks added nearly $10,000,000 to our export trade last year. Exports of sulphite pulp account for approximately 85 per cent of these shipments. The remaining 15 per cent consists largely of rags and other waste for paper-making, pulpwood, and soda and other wood pulp not sufficiently large to receive separate classification. This trade has more than doubled over the past three years, chiefly as a result of the rise in sulphite exports. Shipments to foreign countries of this class of pulp increased more or less steadily each year from 1922 to 1928, when they reached a total of 24,945 short tons. In 1929 this figure rose to 43,852 tons, but was followed by a sharp decline in 1930, and this volume was not reached again until 1933 when shipments totaled 77,165 tons. Shipments in the following year rose to 139,697 tons, and in 1935 reached a top figure of 166,416 tons.

Exports of other classes of wood pulp have varied between 2,000 and 4,000 tons per year over the past five years up to 1935 when they reached a total of 5,294 tons. Exports of paper-making rags and waste during this period have averaged around 35,000 tons except in 1934 when they reached a total of 53,264 tons.

Our total shipments of paper base stocks in 1935 were valued at $9,890,499, of which $8,632,971 represented exports of wood pulp, $1,075,721 exports of rags and other waste, and $181,807 exports of pulpwood.

Imports of paper base stocks into the United States during the past five years have been characterized by a marked decline in ground wood while receipts of chemical pulp on the whole have shown a rising tendency. This situation held through 1935, ground wood imports dropping to a new low of 180,000 short tons, while imports of chemical pulp not only exceeded those of the preceding year by 8 per cent but were the highest yet on record. Imports of all classes of chemical pulp contributed to this increase, with proportionally the heaviest gains occurring in receipts of bleached sulphite, kraft and bleached sulphate pulps.

Imports of wood pulp during the first three quarters of

the year showed a tendency to lag behind the previous year's receipts. Incoming shipments during a few months, and notably January and May, were substantially above the corresponding months in 1934, but as a whole receipts up to the end of September were slightly behind those of the preceding year. During the latter month imports picked up, and were followed by further gains in the succeeding three months, bringing imports during the last quarter to a volume nearly 35 per cent in excess of the corresponding period in 1934. Total imports of wood pulp for the year amounted to 1,923,249 tons as against 1,805,975 tons in 1934, an increase of 6 per cent. The increase in the value of these receipts was even greater owing to the large proportion of bleached sulphite, kraft, and bleached sulphate pulp in the 1935 receipts.

Heavy increases also occurred in imports of rags and of other waste stock for paper making. Imports of rags nearly doubled in volume and show an increase of 85 per cent in value, while receipts of other waste rose by approximately 50 per cent in both volume and value.

Total receipts of paper base stocks for the year were valued at $82,043,697, representing 1,037,332 cords of pulpwood valued at $7,760,700; 1,923,249 tons of wood pulp valued at $70,760,921, and 139,555 tons of rags and other waste valued at $3,522,076.

Imports of paper into the United States consist principally of newsprint, which represents each year between 85 and 90 per cent of the total value of such receipts. Imports last year totaled 2,388,300 tons, exceeding the 1934 receipts by 8 per cent and falling less than 1.5 per cent short of 1929 receipts.

Other classes of paper and board were valued at $11,178,649, exceeding importations in this line in 1934 by 9 per cent. This rise was largely due to the heavy increases which took place in imports of printing papers, other than newsprint, and boards and to a threefold increase in imports of kraft wrapping. Imports of other classes of wrapping papers and of writing papers, other important items on this schedule, declined substantially, while imports of cigarette papers, which rank second to newsprint in the value of product, dropped off 4 per cent.

A comparison of the figures covering both the import and export paper trade of the United States during 1935 with the immediately preceding years would indicate that the industry is definitely on the mend. Not only were exports of pulp and paper larger than at any time since 1931, but the heavy increase in imports of wood pulp during the last quarter as compared with the corresponding period in 1934 indicates that paper manufacturers are viewing 1936 prospects with more optimism.

H. T. Fretz Approved Pulp Testing Chemist

The Joint Committee on Approved Pulp Testing Chemists for the Paper Industry announces that Harold T. Fretz of the Olympic Forest Products Company, Port Angeles, Wash., has been accepted by the committee as an approved paper and pulp testing chemist and is listed as such, effective February 6, 1936.

Production Ratio Report

The statistics are based upon paper production reports to the American Paper and Pulp Association.

COMPARATIVE MONTHLY SUMMARIES

Month	1936	1935	1934
January	76.2%	65.8%	.....
February	.....	70.0%	.....
March	.....	70.5%	.....
April	.....	70.0%	.....
May	.....	69.4%	.....
June	.....	72.3%	.....
July (b)	.....	67.8%	.....
August	.....	70.9%	.....
September (c)	.....	75.0%	59.4%
October	.....	75.6%	64.7%
November	.....	75.3%	61.7%
December (a)	.....	74.3%	62.1%
YEAR	.....	71.2%	.....

COMPARATIVE WEEKLY SUMMARIES

CURRENT WEEKS, 1936		CORRESPONDING WEEKS, 1935	
*February 8	77.9%	February 9	69.5%
*February 15	76.5%	February 16	71.0%

The following statistics show the number of mills reporting by ratio groups:

Ratio Limits	Number of Mills Reporting, Current Weeks: February 8, 1936	February 15, 1936
0% to 50%	80	56
51% to 100%	247	164
Total Mills Reporting	327	220

* Subject to revision until all reports are received.
These data exclude (a)—Christmas Day, (b)—Fourth of July, (c)—Labor Day.

PAPERBOARD OPERATING RATIOS

According to reports from the National Paperboard Association, per cents of operation, based on "Inch-Hours," were as follows:

1934		1935		1935		1935	
September	62%	January	61%	May	61%	September	69%
October	63%	February	67%	June	65%	October	76%
November	56%	March	67%	July	59%	November	70%
Dec. (a)	53%	April	61%	August	65%	December	60%

Week ending Jan. 4, 1936	51%	Week ending Feb. 1, 1936	63%
Week ending Jan. 11, 1936	65%	Week ending Feb. 8, 1936	66%
Week ending Jan. 18, 1936	61%	Week ending Feb. 15, 1936	66%
Week ending Jan. 25, 1936	64%		

Michigan Superintendents Meet

The regular February meeting of the Michigan Division of the American Pulp and Paper Mill Superintendents' Association was held at the Park-American Hotel on Thursday evening, February 20. About forty-five were present to sit down to dinner, after which Chairman Otto F. Fischer called the meeting to order. F. L. Sellers, vice-president of the National Association, and general chairman of the National Convention Committee, addressed the members, explaining and outlining the plans under way for the big convention in Grand Rapids, June 24-26. Everything indicates that this will be the largest convention ever, both from the attendance and exhibit standpoint. Especial attention is being given to the machinery and exhibits and the reservations for space already received have been most encouraging. Manufacturers of machinery or of products used or applicable in the paper industry are being contacted and urged to make a display at the convention. Hotel reservations have also been pouring in altho as yet no reservation cards have been sent out.

The guest speaker was T. C. Roberts of the Beloit Iron Works. He had several rolls of motion pictures which showed the latest developments perfected by his company, including the High Speed Shake, Suction Couch Rolls, Suction Press, Suction Slice, Beloit Drums and Beloit Removable Fourdrinier Section. The pictures, accompanied by frequent comments and explanations by Mr. Roberts, made a very interesting and instructive feature for the members. Discussions followed, after which adjournment was declared.

5C ALWAX SIZE

a new and better size for paper

American Cyanamid has spent much labor and research in the development of more efficient Wax Sizes for the paper industry. 5C ALWAX SIZE is a new product that shows the benefits of this labor and research. It is

EASIER TO HANDLE
BETTER IN COLOR
MORE EFFICIENT

than former sizes • May we demonstrate its advantages? Our service covers the use of every specific sizing problem and is available to *you*.

American Cyanamid & Chemical Corporation

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

Section of the
Technical Association of the Pulp and Paper Industry
Edited by Ronald G. Macdonald, Secretary

Ohio TAPPI Hears Curran

The Ohio Section of the Technical Association of the Pulp and Paper Industry met at the Manchester Hotel, Middleton, Ohio, on Friday evening, February 21, 1936. Approximately seventy members and friends of the association assembled for the dinner meeting.

After a short business session the men were individually introduced to the group. The chairman, Vincent Waters, of the Wrenn Paper Company, then introduced the speaker of the evening, Dr. Carl E. Curran, in charge of the Paper and Pulp Section of the Forest Products Laboratory, Madison, Wis.

New Viewpoints on Old Problems

Dr. Curran presented a spirited and interesting talk on the general topic "New Viewpoints on Old Problems." He first showed a number of stereopticon slides of the Forest Products laboratory building and equipment used in pulp and paper research and in working out the numerous problems involved in paper manufacture. Dr. Curran summarized the development of multiple stage bleaching, which is rapidly replacing the single stage process, and emphasized the importance of the bleaching operation on the quality and type of pulp which is desired.

Another Important Development

Another development of importance to the pulp and paper industry is the gradual introduction of various species of wood which can be used for pulp manufacture, especially the developments being made in recent years involving spruce and southern pine. The speaker predicted that in the near future the United States could supply all the wood pulp needed in this country and have some to export, thus eliminating the present necessity of importing thousands of tons yearly.

Dr. Curran also related some of his experiences with the effect of growth conditions on the resulting pulp obtained. He then dealt on recent developments of waste sulphite liquor ultilization, development of paper machine controls, and analysis of the numerous variables present during the converting of pulp into paper. Considerable discussion followed.

Those Who Attended

Those present included: A. J. Wildman, Beckett Paper Company; P. H. Dumas, Chrome Plating Company, Milwaukee, Wis.; R. H. G. Smith, C. A. Sorg, Sorg Paper Company, Middletown, O.; Roy W. Maggart, Dr. George C. Munro, Champion Paper and Fibre Company, Hamilton, O.; C. V. Appel, Stuart McGee, M. D. Woodruff, J. Markley, all from the Bauer Brothers Company, Springfield, O; Chas. Rybolt, E. E. Grant, vice-president, Crystal Tissue Company, Middletown, O.; M. L. Barker, Edward Lum, Val Friedrich Jr., L. P. Wheeler, Myron Wittmer, W. J. Reigers, Beckett Paper Company, Hamilton, O.; W. S. Timme, W. M. Bevis, R. H. Brossmer, Paul E. Howard, Dan A. Donnelly and S. G. Bevis, president, Bevis Machine Company, Middletown, O.; Carl D. Roess, V. F. Waters, Max Eisenmenger, Wrenn Paper Company, Middletown, O.; H. C. Fisher, C. R. Merriman, James C. Richardson, Richard Holmes, Thage Dahlgren, Gardner-Richardson Company; Lockland, O.; James Cobbic, A. R. Harvey, Jack Smith, Jr., Gardner-Richardson Company, Middletown, O.; W. H. Scott, W. H. Whittington, R. M. Shields, The Duriron Company, Dayton, O.; R. H. Henry, J. H. Allison, A. J. Allison, The Simonds Worden White Company, Dayton, O.; C. J. McMahon, Appleton Woolen Mills, Appleton, Wis.; D. E. Fay, The D. E. Fay Plumbing Company, Middletown, O.; Dr. Carl E. Curran, Forest Products Laboratory, Madison, Wis.; Douglas Robbins, The Douglas Robbins Sales Company, Middletown, O.; R. R. Weber, Mathieson Alkali Works, Cincinnati, O.; H. Waffenschmidt, National Aniline and Chemical Company, Cincinnati, O.; W. T. Bagel, H. E. Wilcox, H. L. Heise, The Gummed Products Company, Troy, O.; Chas. H. Pippert, Shartle Brothers Machine Company, Middletown, O.; Thomas M. Burke, Container Corporation of America, Cincinnati, O.; C. F. Nelson, O. P. Gephart, Miamisburg Paper Company, Miamisburg, O.; T. M. Chemerys, Champion Paper and Fibre Company, Hamilton, O.; John E. Burdsall, Crystal Tissue Company, Middletown, O.; John P. Gerhauser, Aladdin Industries, Inc., Alexandria, Ind.; H. G. Macklem, student, University of Cincinnati, Cincinnati, O.; R. L. Kutter, P. H. Goldsmith, Black Clawson Company, Hamilton, O.; Wm. Beckett, Homer H. Latimer, Beckett Paper Company, Hamilton, O.; R. B. Jones, Central Steel and Wire Company, Dayton, O.

Kalamazoo TAPPI To Meet

The Kalamazoo Valley Section of the Technical Association of the Pulp and Paper Industry will meet at the Park-American Hotel, Kalamazoo, Mich., on Thursday, March 5th, at 7:30 P. M

M. D. Bardeen, of the Lee Paper Company, will talk on "Beating and Beating Equipment."

H. M. Annis of the Allied Paper Mills will review some of the papers presented at the national convention of TAPPI.

There will also be the annual election of officers.

N. Y. College of Forestry Tappimen Dine

The dinner of the Pulp and Paper Alumni of the New York State College of Forestry, which is held annually during the week of the TAPPI Convention, took place as usual this year at the Sacher Restaurant on Wednesday, February 12th.

The faculty of the College was represented by Assistant Dean Clyde Leavitt, Prof. C. E. Libby, head of the Department of Pulp and Paper Manufacture, and by Mr. W. O. Hisey.

As usual, the meeting was entirely informal. Profs. Leavitt and Libby gave short talks describing the progress being made by the College, particularly as regards the installation of the new pulp and paper laboratories. There were several other very brief and informal talks.

The dinner was well attended by alumni of virtually all classes, as follows:

1913: W. A. Munro, president, Flambeau Paper Company, Park Falls, Wis.
1916: C. G. Weber, National Bureau of Standards, Washington, D. C.
1917: W. L. Glass, Economy Filler Processes, Albany, N. Y.
1918: H. M. Meloney, insurance, Douglaston, Long Island.
1920: Karl A. Swenning, Mead Corporation, Kingsport, Tenn.
1921: H. E. Weston, *The Paper Industry*, Chicago, Ill.
1923: H. P. Gannon, Container Corporation, Manayunk, Penn.; B. L. Kassing, Hammermill Paper Company, Erie, Penn.
1925: Mortimer Riemer, attorney, 217 Broadway, New York; L. M. Roope, International Paper Company, New York City; W. R. Willets, Titanium Pigment Company, Brooklyn, N. Y.
1926: W. O. Hisey, College of Forestry, Sqracuse, N. Y.
1928: C. L. Van Schaick, Individual Drinking Cup Company, Easton, Penn.
1929: J. B. Atwater, Dill and Collins, Philadelphia, Penn.; E. N. Wennberg, Continental Diamond Fibre, Bridgeport, Penn.
1930: H. O. George, International Business Machines Company, Endicott, N. Y.
1931: A. H. Anderson, Individual Drinking Cup Company, Easton, Penn.; M. E. Blew, Strathmore Paper Company, W. Springfield, Mass.; F. Casciani, Electro Bleaching Gas Company, Niagara Falls, N. Y.; E. P. McGinn, St. Regis Paper Company, Deferiet, N. Y.; H. M. Schulman, Mabrand Products Company, Long Island City, N. Y.; L. M. Sutherland, Sloane-Blabon Corporation, Trenton, N. J.
1933: P. W. Hardesty, Brownville Board Company, Brownville, N. Y.; M. Landberge, General Dyesuff Corporation, New York City.
1934: I. V. Earle, Individual Drinking Cup Company, Easton, Penn.; W. B. Morehouse, Lawless Brothers' Paper Mills, E. Rochester, N. Y.
1935: A. McAneny, Bradner Smith & Co., Chicago, Ill.

Delaware TAPPI To Meet

The Delaware Valley Section of the Technical Association of the Pulp and Paper Industry will meet at the Engineers Club, 1317 Spruce Street, Philadelphia, on Friday evening, February 28, at 6:30 P. M. The speaker will be John D. Rue of the Hooker Electrochemical Company, Niagara Falls, N. Y., who will talk on "Bleaching and Chlorination."

C. E. Curran Addressed New York TAPPI

The Northern New York group of the Technical Association of the Pulp and Paper Industry met at Tubbert's Restaurant, Syracuse, N. Y., Saturday evening, February 15, 1936, at 6:30 P. M. C. E. Libby of the New York State College of Forestry presided as chairman.

The speaker was C. E. Curran of the Forest Products Laboratory, Madison, Wis. Dr. Curran said in part the Forest Products Laboratory consists of eight sections, of which the Pulp and Paper Section is one.

Some of the more recent work of the Pulp and Paper Section has been on the quality of pulp produced from compression wood. Compression wood is wood that has been compressed during growth by the force of wind, bending, etc.

It has been found that compression wood contains less cellulose, more lignin and produces pulp that is inferior in every respect.

The butt logs of southern pine were found to contain more compression wood than the upper parts of the tree, and consequently these butt logs produce inferior pulp.

Some work has been done on the coloring matter of Pine Kraft pulp. This coloring matter has been isolated and found to be a Phlobotannin.

These phlobotannins also cause the dark color of western hemlock sulphite. They can be removed with dilute alkali.

It is also believed that the reddening of sulphite pulp under certain conditions may also be caused by phlobotannins.

Dr. Curran illustrated his talk with slides. He exhibited an ash tray made from a condensation material which was produced at the F. P. L. from sawdust, sulphuric acid and furfural. Dr. Curran also told about other work which needs to be substantiated, and therefore he does not want it published as yet.

Among those present were C. E. Curran, Prof. Libby, F. C. Peterson, W. O. Hisey, New York State College of Forestry; Carl Apelgran, C. H. Plantz, R. Murtaugh, B. Recknagel, St. Regis Paper Company, Oswego; E. P. McGinn, St. Regis Paper Company, Deferiet; F. Casciane, Electro-Bleaching Gas Company; W. B. Morehouse, Lawless Bros., East Rochester; Milton Maguire, Paper Makers Chemical Company; Herbert Phillip, Solvay Process Company; F. M. and Dexter Williams, Williams Apparatus Company.

Norwegian Newsprint Exports Up

WASHINGTON, D. C., February 26, 1936—Norwegian exports of newsprint in 1935 registered an appreciable increase over the preceding year, according to a report from Vice Consul W. D. Dowling, Oslo, made public by the Commerce Department.

Shipments abroad in the calendar year 1935 totaled 159,982 tons compared with 136,949 tons in 1934, an increase of 23,033 tons. Great Britain was the most important market for this item, followed by the United States, Argentina and Belgium. The wide distribution of Norwegian newsprint is indicated by the fact that 1935 exports were consigned to approximately 50 world markets, it was stated.

Official production statistics covering the production of newsprint in Norway in 1935 are not yet available. A preliminary estimate by the Norwegian Paper Maker's Association, however, places the output in that year at approximately 165,000 tons, a total which compares with 150,000 tons in 1934.

It is estimated that the combined capacity of all newsprint paper mills in Norway is 250,000 tons per annum, the report states.

Pulp Testing By A Rapid Sheet Making Process*

By James Coghill[1]

Abstract

The possible uses of test sheets are analysed and the requirements for an adequate test sheet making process and equipment set up. The design of the equipment for meeting these requirements is illustrated and explained, and the various features of the design and use of the equipment are commented upon or analysed. Standard procedures for use of the equipment and testing the sheet are recommended and explained. The overall reproducability of results by the same and different operators is examined. The degree to which the method and apparatus developed meets the initial requirements and the manner of use for each requirement is discussed. The report includes graphs and tables which are of a preliminary nature, based on only one month's experimentation with the apparatus, and must be varified and amplified by further analysis.

The following is a report of a machinery manufacturer to the Technical Association on a new method and apparatus developed for the analysis of pulp samples in terms of physical characteristics of the paper. This development was undertaken in the belief that the paper industry is in need of such a method and apparatus. Satisfactory business in a given apparatus or article cannot be conducted unless the following three requirements are fully, and honestly met.

1. There must be a real requirement for a certain operation to be performed.
2. That requirement must be analysed and a method and apparatus developed which amply fulfills all the features of the requirement.
3. The method and apparatus must be adequately presented to the individuals who need it.

This report follows, in general, the above outline. Little attention has been paid to the literature on the subject of sheet making and testing. However, acknowledgment is hereby made to the "Interim Report of the Pulp Evaluation Committee of the Technical Section of the Paper Makers' Association of Great Britain and Ireland," published in October 1929 by that Association. The data contained in the "Experimental Section" has been helpful.

Scientific analysis of the various operations is not attempted since, to be satisfactory to all concerned, that must be done by disinterested parties. Such analyses as are contained in this report constitute no more than that which the manufacturer must find out about his apparatus in order to verify the fact that it meets the initial requirements.

The experimental work, upon which this report is based, was made possible through the generosity of the Bryant Paper Co., Kalamazoo, Mich., who allowed the work to be carried out in their plant, with the assistance of their capable technicians. Acknowledgment is also made for the much needed advice and hearty cooperation received from Merle R. Wilkins, chief chemist of that mill. The manufacturer is also indebted to the Lowe Paper Company, Ridgefield, N. J., for the encouragement provided by their purchase of the first unit and for their cooperation in developing various mechanical features of the apparatus.

* Presented at the Annual Meeting of the Technical Association of the Pulp and Paper Industry, Waldorf-Astoria Hotel, New York, N. Y., Feb. 17 to 20, 1936.

[1] Member TAPPI, Noble and Wood Machine Company, Hoosick Falls, N. Y.

The Requirements of a Sheet Making Process

If a certain process or apparatus is needed, the purposes for which it is needed, and will be used, must be analysed from the standpoint of the ideal. The final solution of the problem will, generally, fall short of the ideal in some respect. However, the solution must be sufficiently close to the ideal to fulfill the majority, or the most important, of the requirements. Therefore, the possible uses of test sheets, and the process and apparatus requirements of the ideal solution for each use, are set forth as conceived by the manufacturer.

The Possible Uses of Test Sheets

Why should anyone want to make sample sheets? Let us assume that anyone, with little skill in the papermaking art, could make a sample sheet in a minute or two from a handful of pulp and that the sheet thus made reflected the true qualities of the pulp used. In that event innumerable samples would be made daily in every paper mill, and the purposes for which they were made would fall in one or another of the following groups.

1. For evaluation of pulps used as raw materials.

A standardized rapid beating process would show the available characteristics of a sheet in terms of that particular standardized type of treatment. Correlation of the standardized treatment with the type administered by the various commercial machines available, would tell the papermaker just what he could do with every car of pulp unloaded or every digester from the pulp mill.

2. For control of processes.

The mill operators would sample the stuff at the various stages of treatment and govern the use of machinery accordingly.

3. For record of processes.

Samples would be taken at various stages of treatment for many orders made. The results would be used to aid in the reproduction of that particular grade on the next order.

4. For selection of furnish.

Some standardized beating process would be invoked here, perhaps with modifications to more nearly represent the type of treatment administered by the commercial units available. Experiments would be frequently made by blending different pulps, sizes, fillers, etc., in order to intelligently design the furnish to meet desired physical requirements in the light of equipment available for treatment.

5. For analysis of mechanical treatment and chemical processes.

The quality or type of mechanical treatment administered by various commercial and experimental units would be analyzed, and the effect of various operating conditions on paper characteristics would be learned. The best equipment for the particular purpose could the selected and each unit used at its best advantage. Chemical processes would be studied in the same manner.

Test sheets have been made and used for many years. At present, sheet making methods are available which are amply accurate and reproducible to fulfill all of the above requirements. However, they are not in general use. The reason is that more than accuracy is required. Speed and simplicity are also requirements. By "simplicity" is meant the reduction of the procedure to simple motions in sequence, not requiring the exercise of judgment. In other words, elimination of the "human element."

Use Requirements

Let us consider each of the above uses as regards its requirements of speed and simplicity, assuming that accuracy and reproducibility are of paramount importance.

1. Evaluation of pulps:

This can be done with two ends in view. Either to guide purchase or manufacture alone, or to guide the use of the actual pulp tested as well as pur-

chase or manufacture.

In the first case speed is not essential except as it effects the cost of making tests. In the second case, speed is esantial.

In either case testing will be done by an experienced technician so we can count on a fairly high grade and reliable "human element."

2. Control of process:

Speed is essential. The quicker that paper tests can be obtained from a sample of pulp, the better. In most cases if results cannot be obtained within a few minutes, they are not worth getting.

Simplicity is also essential. A technical man cannot do this job unless he is also the superintendent. Control tests are of no use whatever unless the results of the tests are applied promptly by the operating man. Therefore the use of the apparatus and the technique involved must be so simple that the mill operators can use it themselves and still get quick and reliable results. This means that the "human element" must be practically eliminated and the technique resolved into simple motions in sequence. The procedure must be so simple that the superintendent, the chemist, the beater boss, and a high school boy can all make sheets from the same can of stock, test the sheets, and all get the same result. Furthermore, all must be able to learn the procedure in a few trials. No slide-rule or complicated charts may be used.

3. Record of process:

In this case time is theoretically not so essential except as it effects the cost of getting results. Practically, however, time is essential. If results are delayed by drying or conditioning operations the confusion resulting from overlapping tests would make the practice of this sort of testing intolerable in most mills.

Simplicity is essential since tests must be made by shift workers and co-ordination of their technique would be impossible without it.

4. Selection of Furnish:

Neither time nor simplicity are actually essential since an experienced technician can do this work. However, the amount of work that can be accomplished, and the cost of doing it, depend upon speed and simplicity. A sheet-making process to fulfill this need must be a good deal faster and simpler than the existing processes, otherwise more mills would be experimenting along these lines at the present time.

5. Analysis of mechanical treatment and chemical processes:

The same remarks as for 4 (above) apply to this requirement.

Ideal Apparatus Requirement

Any person of average intelligence with not more than an hour's practice, and by following a prescribed sequence of simple operations, not requiring the exercise of judgment, must be able to take a small sample of pulp at unknown consistency and obtain reliable figures representing the true characteristics of the pulp in terms of significant sheet properties within a very few minutes.

The above represents the overall requirement drawn from the study of the desirable application of test sheet making. Obviously it is no simple problem and, before tackling the design of the equipment, we must specify the results that are to be expected within the limit of practicability.

In the study of the possible uses of test sheets only the practical or operating uses have been considered. There is another and important use, not of test sheet making, by of the apparatus. This is the study of papermaking variables. The extent to which these can be carried out depends upon the mechanical features of the equipment. Therefore, in design of the equipment it is desirable to make every step in the process as flexible as possible from the standpoint of adjustibility for research purposes. Since, from the commercial standpoint, the practical uses of sheet making are far more important than the research uses of the equipment, it is advisable, in the design, to concentrate on the exact apparatus requirement above.

Desirable Test Results

If the true characteristics of the pulp samples are to be expressed in terms of significant sheet properties, it becomes necessary to select which tests can be applied to sheets. Here the factor of time comes into the picture again. It is therefore necessary to go back to the uses of sheet making and judge what physical tests can or should be applied to the sheet and what information is desired about the sample for each type of use.

In the following analysis it is assumed that all sheets will be of uniform weight. The tests selected for each use are those which, it is believed, are the very minimum requirements in order that the operator, in the majority of cases, will know what he needs to know about the sample.

1. Evaluation of pulps: Slowness, burst and tear. Some operators will also want fold, tensile, stretch and opacity.
2. Control of process: Slowness, burst and tear.
3. Record of process: Slowness, burst and tear.
4. Selection of furnish: Slowness, burst and tear. Fold, tensile, stretch, formation, finish, thickness, bulk, opacity, ash, sizing, smoothness, stiffness, and perhaps other tests of physical or chemical nature.
5. Analysis of mechanical treatment and chemical processes: Slowness, burst, tear, and in some cases, tensile, stretch, opacity and bulk.

It is obvious from the above that slowness, burst and tear are the most important tests. These tests must be made rapidly. The slowness reading must be obtainable during the making of the sheet. The burst and tear readings must be obtained immediately after the sheet is dried. Most of the other tests require more time. Therefore, the proposed apparatus must produce sheets that can be conditioned for physical tests when the time allows.

It would seem, therefore, that in order to fulfill the requirements an apparatus must be designed that will deliver two different types of results.

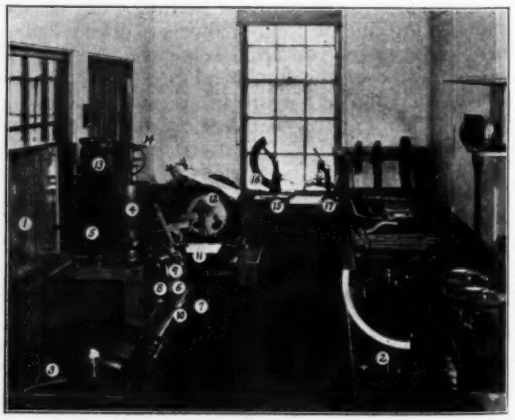
1. Fast and reliable slowness, burst, and tear readings on uniform weight sheets by nontechnical operators.
2. Fast and reliable slowness readings and uniform weight sheets. These to be conditioned and tested for all other properties by skilled operators.

The burst and tear tests are both simple and rapid and can be conducted by almost anyone with moderate training, but other tests such as tensile, fold, etc., require more elaborate apparatus and, to be reliable, require conditioned sheets. When these tests are made it is desirable that the sheets and slowness readings should be produced by nontechnical operators but that the conditioning and testing of the sheets be conducted under more exacting supervision.

It is not expected that burst and tear readings produced in the first instance (above) will agree with those produced on conditioned sheets. The burst and tear testing instruments give purely imperical figures for results and do no more than give a fairly reproducible reading on some obscure combination of sheet and fiber properties. Therefore it is only necessary that the tests on the sheets be reproducible within practical limits.

Neither is it necessary for the slowness reading to agree with any other type of slowness reading. It is only necessary that the reading be able to advise the operator as to how the sample may be expected to act on the paper machine wire, and that it be reproducible.

Since the sheets made by the proposed apparatus must be reliable and reproducible, it can be assumed that if made to meet the requirements of fast results by nontechnical



Sheet Machine and Testing Equipment Arranged for Pulp Testing and Other Purposes in a Paper Mill Laboratory

1. Scales cabinet. 2. Scales—removed from cabinet for illustration. 3. Hot-plate. 4. Proportioner. 5. Sheet mould (partially shown). 6. Lead lined sink. 7. Bench upon which all equipment is mounted. 8. Proportioner measure. 9. Stock pitcher. 10. Mould drop valve handle. 11. Press with felt in place (partially shown). 12. Sheet drier. 13. Electric load center box with switches and circuit breakers for each electrical unit and pilot light for drier heater. 14. Shelf for slowness timer and spare wires. 15. Test sheet shear. 16. Elmendorf tearing tester. 17. Mullen tester.

operators they will be satisfactory for conditioning and testing by skilled operators. If an average person is to use this apparatus, he must perform the following operations without exercise of judgment.

1. Proportioning the sample to make a predetermined standard weight sheet.
2. Forming several sheets of standard weight.
3. Obtaining the slowness reading.
4. Couching.
5. Pressing.
6. Drying.
7. Calendering (in some cases).
8. Checking the sheet weight.
9. Testing for Mullen and Tear.
10. Reporting the results of slowness, Mullen and tear.
11. Preserving one sheet for reference file (in some cases).
12. Preserving enough sheets for full conditioned tests and reporting weight and Slowness in cases where 9, 10 and 11 are omitted.

Desirable Design Features

In undertaking the design of an apparatus to match the above overall and detailed requirement it is desirable to set up the following objectives:

1. Reproducibility of results within practical limits.
2. Simplicity of manipulation to eliminate "human element."
3. Speed of manipulation.
4. Similarity, as much as possible, to paper machine effects.
5. No extra material required for operation aside from stock sample and water.
6. Continued performance of apparatus over a long period of time without change in results and with simple, if any, calibration.
7. Compactness of apparatus.
8. Cost of apparatus.

Description of Apparatus

A complete apparatus based on the above requirement has been designed, constructed, and put into service. It has been carefully checked my the manufacturer as to its ability to meet the requirements. Each unit is as simple as is believed possible in the light of the requirements. They are arranged in convenient position for rapid, co-ordinated use on a substantial work bench and sink combination. Following is a list of the complete apparatus: 1 scales cabinet and scales, 1 hotplate, 1 proportioner, 1 sheet mould, 1 press, 1 drier, 1 stock measure, 1 stock pitcher, 8 forming wires, 1 slowness timer, 2 press felts, 1 acid box and tongs, and 1 bench upon which the above units are mounted including piping, valves, wiring, switches, and circuit breakers.

A brief description of each unit follows, with explanations of the various designs settled upon and descriptions of what has been found out so far concerning the characteristics of each unit.

The Scales

The scales are used to weigh the initial sheets from the proportioning operation, to check the weight on the finished sheets, and to weigh pressed matts and dried sheets in calibration of the press. Since oven-dry weights are desired, it is necessary to get a very quick reading and a scales has been selected which is direct reading from 0 to 10 grams with a balance weight for the pointer which gives readings of from 0 to 20 grams. The standard weight sheet is 2.505 grams. Proportioning sheets range up to about 5 grams but may be as high as 8 grams. Wet matts from the press, used in press calibration range around 7.85 grams.

In order to eliminate air currents, the scales are placed in a plywood cabinet with a sliding, glass door. The hot sheet, directly off the hotplate, is hung on the needlepoint hook and the door closed. After a pause of three or four seconds, the pointer comes practically to rest and the reading of the weight can be accurately taken about 8 to 10 seconds after the sheet left the hotplate.

The moisture picked up during the weighing is negligible. The error is reduced by the fact that the fiber is at a temperature of around 350 deg. F. when it leaves the hotplate and it is scarcely cooled down to the boiling point before it is already on the scales hook and the cabinet door is closed.

If a weight reading on a 2.5-gram sheet is taken within ten seconds after the sheet left the hotplate, it will be found that another ten seconds hanging on the scales will show an increase of approximately .015 grams. Ten seconds more will show an additional .01 grams and thereafter the weight increase is very gradual. The increase in weight after 90 seconds will be approximately 0.03 grams.

In getting oven-dry weights by this method the important thing is to carry the sheet from the hotplate to the scales hook quickly. After the cabinet door is closed, a delay of an additional ten seconds over the usual time will represent an error of only about 0.6 per cent.

The scales and cabinet combination are satisfactory and sufficiently accurate for the purpose of getting bone dry weights (fiber) on sheets off the hotplate which are entirely free of static charges.

The Hotplate

The main purpose of the hotplate is to shorten the time of getting the consistency test in the proportioning operation. It is also used for bone drying finished sheets to check their weight and to oven-dry wet matts from the press to check consistency in calibration of the press. It is not intended, or recommended, for drying sheets for any other purpose than to get the bone-dry weight. The drying rates at different points of its surface are admittedly non-uniform and the temperature of the drying surface is very high.

The cast iron box contains a standard 1500 watt range oven unit. This unit is composed of two coils of 750 watts each, arranged in a flat frame with porcelain insulators, and presenting a heat radiation area approximately 13 inches wide by 12 inches deep. The unit is heat insulated in the box by 1-inch corrugated asbestos on all four sides and beneath it. The box is screwed to the bench top with a ¼-inch asbestos pad between the base and the bench, so as to prevent scorching of the wood.

A three-way range switch is mounted in a convenient position and is arranged to put the heating coils in series

Hotplate

1. Brass surface plate. 2. Three heat switch. 3. Ventilation ports. 4. Spring hinges. 5. 10 mesh bronze clamping wire. 6. Tension springs. 7. Latch (automatically locks in down position). 8. Latch screw.

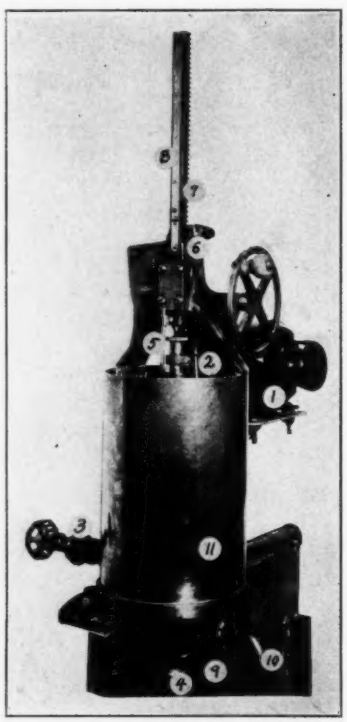
for low heat, one coil only for medium heat, and the coils in parallel for high heat. This represents a wattage of 375, 750, and 1500 watts, respectively. The unit is connected to the load center box with a two-wire, lead-sheathed, flexible cable and is equipped with a 15-ampere circuit-breaker switch.

The sample to be dried is laid on the center of the curved surface plate and the clamping wire is brought down upon it until the latch catches on the latch screw. The wire holds the sheet tightly against the plate and the drying of the sample can be observed through the wire. Within about 3 seconds after visible steam stops rising, the sample is bone-dry. The thickness of the surface plate and its temperature are such that the latent heat of the evaporation of the water in a sheet 8 inches square, containing 10 grams oven-dry of fiber at 35 per cent pressed consistency, is all provided out of the heat units stored in the plate without dropping the plate temperature below 250 degrees F.

Pressed matts from the proportioning operation weigh from 3 to 6 grams, as a rule, after drying, and come to the hotplate at from 35 to 38 per cent consistency. If the sheet machine is in steady use this operation is performed on a cycle of about 10 minutes. Medium heat is the most satisfactory for general use and keeps the surface plate at a temperature of about 450 degrees F. While the pulp matt is drying, the plate surface cools, so by the time all the water is out of the matt, the surface is too cool to scorch the fiber. When the sheet is dry, the latch is lifted and the spring hinges carry the frame and wire to the raised position. The sheet is then immediately hung on the scales and weighed.

A certain amount of scorching does not seem to materially effect the weight of chemical pulps. Groundwood should not be scorched. A 3-gram oven-dry sheet, 8 inches square, placed on the hotplate at 33 per cent consistency is bone-dry in 15 seconds and will remain perfectly white and unsorched for another 30 seconds without changing weight. A 5-gram oven-dry sheet at 35 per cent consistency requires 35 seconds to bone-dry and will remain a much longer time on the hotplate without sorching.

In using the hotplate for moisture tests on dry 40-pound paper, 3 or 4 seconds is ample time for exposure on the plate. It is easy to avoid scorching, since the sheet can be observed perfectly through the fine 10-mesh wire. On 160-pound paper, the exposure should be about 7 or 8 seconds.



PROPORTIONER

1. ¾ h.p. motor mounted on sliding base with rubber cushions. 2. Monel metal propeller shaft on precision ball bearings arranged at an angle to vertical axis and with 2-inch monel metal propeller 2 inches from bottom of cylinder. Belted to run 2,600 r.p.m. 3. Proportioner valve, admits fresh water. 4. 1¼-inch draft tube. Slides vertically through packing in base. Open at top and bottom and connected adjustably to rack. Top edge is visible just above rim of cylinder. 5. Calibration pointer. Necessary to set scale and draft tube in proper relationship with liquid surface or to check same. Should be removed for operation of unit. 6. Fixed pointer cooperating with scale. 7. Rack operated by hand wheel for controlling position of draft tube. 8. Etched scale calibrated from 2.6 grams to 12 grams and marked at 8.500 cc. 9. Sampling valve. Poppet type, flush with bottom of cylinder ⅛-inch diam. by ½-inch stroke. Wing on end of stem catches in notch in casting to hold open when desired. 10. Sampling spout ¾ inch diam. 11. 8 inches diam. cylinder 12 inches high.

THE PROPORTIONER

The problem of taking a sheet of unknown consistency and producing sheets of uniform weight is one generally involving calculations. Since the equipment requirement, previously established, precludes the use of a slide-rule or charts, it is necessary to design a proportioning apparatus that can be used rapidly and without calculation or reference.

When the paper chemist wishes to prepare a sheet of predetermined weight from a sample of unknown consistency, he usually goes through the following procedure:

1. He dilutes the stock to some low consistency so the fiber will float freely and the stock may be mixed, poured, and measured with some degree of accuracy.
2. He measures out a certain volume and obtains the consistency.
3. He then calculates how much of the mixture to use in making up to some larger volume in order to obtain the desired consistency.
4. Then he adjusts this calculated amount by his estimate of the wire loss in his sheet mould.
5. Next he measures out the amount so estimated.
6. He dilutes it to the predetermined volume.
7. He uses a predetermined size measure of stock out of this volume to make his sheets.

Sometimes the procedure is varied by measuring out a calculated amount for each sheet, but the effect is the same and the calculations are practically the same.

There seems to be no reliable shortcut on the above procedure. However, the operations and calculations can be greatly simplified by establishing certain constants. There is no point in getting involved here in the formulas and equations of these calculations. A few simple proportions expressed on the basis of fixed volumes and weights that have been selected for this apparatus will enable the reader to understand how it functions.

In this proportioner, the initial volume of stock has been established at 8,500 cc. The amount of stock taken from this volume for consistency test is 898 cc. The desired weight bone dry of the finished sheet is 2.505 grams or 40.9 pounds oven-dry basis. (25-38-500), or 43.1 pounds air dry (5 per cent moisture) basis, or 60 grams oven-dry per square meter.

Following the above outline, a consistency test is made on the 898 cc. sample drawn from the initial 8,500 cc.-volume. Instead of making a true consistency, the sample is put through the same sheet mould on which the finished sheets are to be made, and in the same manner. It is then pressed, dried on the hotplate, and weighed.

The next step is to calculate the amount of the initial stock to take so that, when diluted back to 8,500 cc., the next sheet made will weigh 2.505 grams oven-dry. The

same 898-cc. measure is used for drawing stock for test sheets.

It is not necessary to consider the matter of wire loss in this process since we are dealing with sheet weights made on the same sheet mould. The first or proportioning sheet is necessarily heavier than the desired weight and, as a matter of fact, the per cent loss is slightly different. It is not enough, however, to cause great inaccuracies in weight and that matter will be dealt with in a later paragraph. For practical purposes, the wire loss in the proportioning sheet cancels out the wire loss in the test sheets and direct proportions of weights and volumes can be used in calculating the amount of the initial stock to take.

The amount to take of the initial stock to get the desired sheet weight is expressed in the following relationship.

$$\text{Amount to take} = \frac{8500 \times \text{desired weight (2.505 grams O.D.)}}{\text{Weight of initial sheet in grams O.D.}}$$

or:

$$\text{Amount to take} = \frac{21290}{\text{Weight of initial sheet in grams O.D.}}$$

If the reader has studied the accompanying photograph, he will see that a vessel is provided with a relatively small cross-sectional area and an open tube which can be run up and down in the center by operation of a crank on a rack. To the rack is attached a scale. This scale could be calibrated in the cc. volume of the vessel, making proper allowances for the differences between the level of the liquid and the level of the top of the draft tube (due to surface tension). The operator could then weight the proportioning sheet, calculate the amount to take, and crank the draft tube down to the proper point as indicated by the scale. The excess would run out the draft tube down to that level and the amount left in the vessel would be the calculated amount.

To eliminate the figure work on the part of the operator, these calculations have been made over the entire range of initial sheet weights and the scale is calibrated in grams bone dry initial sheet weight, instead of in cubic centimeters.

The proportioning step can, with this apparatus, be performed by the following sequence of operations:

1. Dump the unknown consistency sample into the proportioner. Be sure it is more than enough stock. (28 grams oven-dry or more).
2. Set the scale at 8500 cc. mark and turn on the water valve until the mixture is just about to overflow into the draft tube.
3. Raise the draft tube to its highest position and turn on the agitator.
4. After about 10 seconds agitation draw the 898 cc. measure full to overflowing.
5. Make a sheet (by the methods described later). Press it, dry it on the hotplate, and weigh it.
6. Stop the agitator and within 5 seconds time quickly crank the draft tube down until the weight of the sheet shows opposite the pointer.
7. As soon as the stock is done flowing out the draft tube, crank the scale back up to the 8500 mark and fill up with water as before.

This entire operation can, after a few trials, be performed by any average person in 3 minutes' time. A skilled operator completes it in about 2½ minutes unless the stock is slow draining in the mould.

The amount of stock in the proportioner after this operation is approximately 23.7 grams plus the necessary amount to provide for the wire loss in the sheet mould. The consistency is pproximately .279 per cent oven-dry plus the same correction. The propeller gives a vigorous turnover (vertical) of the stock with some slight and intermittent rotation. This assures positive mixing and relatively accurate measuring, even of the most difficult of fibres, such as raw Alpha sulphite. The proportioner contains enough stock for 8 sheets, allowing ample for slopping over when filling the measure.

The 898 cc. measure is nickel plated brass with a neck opening of approximately 2½ inches. The neck is calibrated and cut off to the right height so that it holds the required volume when overflowing. The small size of the neck reduces the error in measuring since 1 per cent error in volume represents over ⅛ inch error in level. This amount may easily be avoided.

The size of the measure does not affect the proportioning operation as long as the same measure is used for the initial sheet and for the test sheets. The only effect is on the consistency in the proportioner. The resulting consistency in the proportioner is expressed by the following:

$$\text{Proportioner consistency (plus wire loss)} = \frac{2.505}{\text{Volume of measure in cc.}}$$

Thus 0.5 consistency (plus wire loss) may be obtained by using a 501 cc. measure and an 0.15 per cent may be obtained by using a 1670 cc. measure. In any event the proportioned sheet will weigh 2.505 grams theoretically. Actually the heavier consistencies in the proportioner will cause more errors all the way through, particularly with long fibred stock. 0.279 per cent is about the heaviest that long fibred stocks can be properly measured and, for very exact work, less than that is desirable.

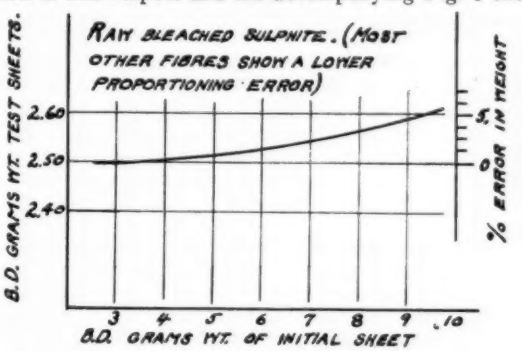
Consistency Reading

There is another reason why 898 cc. has been selected as the measure size. It happens that with the use of this measure, and by taking exactly one quart of the stock sample, the weight of the proportioning sheet in grams is numerically equal to the original per cent consistency of the quart sample. This gives a quick consistency reading without calculations and can be used on samples ranging between 2.9 per cent and 10 per cent consistency. For thinner stocks two quarts or a gallon may be used and the sheet weight divided by two or four respectively to get the consistency. The reading thus obtained is subject to the error of wire loss which is negligible for most consistency testing purposes. This error ranges from less than 1 per cent to around 4 per cent of the consistency reading depending on the nature of the fiber and the consistency of the sample.

As mentioned above the amount of stock sample required is 28 grams oven-dry or more. Actually 26.5 grams is enough providing there is no loss by slopping over the measure when the initial sample is drawn from the proportioner. Since more accurate measuring can be made with plenty of slopping over, 28 grams is recommended as a minimum. However, the closer the sample taken is to the minimum weight, the more accurate will be the proportioning.

The Proportioning Error

The overall accuracy of the proportioner has been examined in this respect and the accompanying Fig. 1 shows



PROPORTIONING ERROR IN TERMS OF THE WEIGHT OF THE INITIAL SHEET.

Fig. 1

how the test sheet weights vary in terms of the weight of the initial sheet.

From Fig. 1 it will be observed that the proportioning error causes sheet weights to increase with increasing initial consistency in the proportioner. The curve of a raw, long fibered, bleached sulphite stock was selected for illustration since that type of fiber shows the greatest error. At 10 grams initial sheet weight, the overall error of the proportioner on this stock is approximately 4.8 per cent. At 5 grams it is only 0.6 per cent. Since this is a fundamental directional error it is best to reduce it as much as possible by keeping the initial sheet weight down and not putting too large a stock sample into the proportioner. The nearer the sample is to the minimum of 28 grams, the more accurate will be the results.

Size of Sample

The initial sheet weight (plus the wire loss) is approximately 0.0850 times the number of grams bone dry in the sample. Since a proportioning error of 1 per cent is introduced (on raw bleached sulphite) at an initial sheet weight of about 5.8 grams it would seem advisable to establish a maximum size of the sample at about 68 grams oven-dry. This will keep the proportioning error down to 1 per cent or below on raw sulphite and nearly all other pulps will show a smaller error. This gives us an allowable sample size of from 28 grams to 68 grams and the following table (Fig. 2) gives the amount of stock sample to take in terms of the consistency of the sample. As will be noticed, the range of sample size is considerable and the operator does not have to guess his consistency very close to come within the limits. If he guesses too low, he has to start over with more stock. If he guesses too high, and the initial sheet weighs over 5.8 grams, he simply drops a portion of the stock out of the proportion and fills up with water for a new start. In any event, the time lost is not more than three minutes.

FIG. 2
RECOMMENDED SAMPLE SIZES FOR DIFFERENT CONSISTENCIES

Estimated Sample Consistency	Sample Size Range U. S. Liquid Quarts	
	Minimum	Maximum
0.35%	9	...
0.50%	6	9
1.0%	3	6
1.5%	2	4
2.0%	1.5	3.1
2.5%	1.2	2.5
3.0%	1.0	2.0
3.5%	0.8	1.8
4.0%	0.75	1.5
5.0%	0.6	1.2
6.0%	0.5	1.0
8.0%	0.35	0.75
10.0%	0.3	0.6

FIG. 3
RECOMMENDED CONSISTENCY RANGE FOR GIVEN SAMPLE SIZES, AND CONSISTENCY READING FACTOR.

Sample Size U. S. Liquid Measure	Range of Applicable Sample Consistencies		Sample Per cent Consistency = B.D. Gms. Initial Sheet Wt. × This Factor
	Min.	Max.	
1 Pint	5.8%	12.0%	2
1 Quart	2.9%	6.1%	1
3 Pints	2.0%	4.1%	2/3
2 Quarts	1.5%	3.1%	1/2
3 Quarts	1.0%	2.0%	1/3
1 Gallon	0.75%	1.5%	1/4
2 Gallons	0.37%	0.75%	1/8

Another and generally more convenient way of expressing the same thing is illustrated in Fig. 3. In this case, fixed sample sizes are given and the range of consistency over which they are applicable is shown along with the factor for obtaining the sample consistency, less wire loss, for each size sample.

It will be noticed that the one quart sample covers the range from 2.9 to 6.1. This is the most important range from the practical standpoint and will cover a very large percentage of all the pulp samples that might be tested. In cases where routine testing is to be done at given points in the mill, the mill chemist can establish the proper size of measure to use so that normal, or even abnormal, consistency variations will cause no difficulty.

Uniformity of Sheet Weights

In connection with the overall accuracy of the proportioner it is necessary to observe the uniformity of the weight of sheets produced. When the routine operations are carried out in reasonable accordance to the prescribed procedure, the weight of no single sheet varies from the predetermined weight of 2.505 grams by more than 1.8 per cent. The weights of successive sheets from the same batch do not vary more than 0.7 per cent from the average. These statements cover long and short and beaten and unbeaten fibers. Short fibers produce more accurate weights than long fibers and beaten fibers are more accurate than unbeaten.

Special Weight Sheets

This proportioner has been developed for the purpose of producing sheets of predetermined weight. However, for certain purposes it is desirable to produce some definite weight of sheet which is different from the standard. Obviously, this can be done by using different amounts of stock from the proportioner in making of the sheets. There is a more convenient and accurate way, however.

The requirements for making sheets of special weights will likely come up in connection with furnish experiments where the test sheets are desired to be the same weight as some commercial sheet. The test standard weight of 2.505 grams equals a basis of 43.1 pounds (25x38-500). It is possible and may sometimes be desirable to make test sheets ranging from 5 to 150 pounds. In cases where a special weight sheet is desired, the proportioner may be used to proportion the stock in exactly the same manner as previously described except that the weight of the initial sheet is multiplied by a factor before the reading is used to set the proportioner scale. The following formula applies:

$$\text{Take as a scale reading in proportioning} \Big\} \quad \frac{\text{O.D. grams initial sheet weight} \times 43.1}{\text{Desired air-dry (95 per cent) basis weight (25x38-500)}}$$

The above applies only to an air-dry basis weight (23x38-500) with 5 per cent moisture. The factor "43.1" is the a.d. basis of a 2.505 o.d. gram sheet 8-inch square. For any other basis or any other moisture content use in place of "43.1" the corresponding basis weight of a 2.505 o.d. gram sheet 8 inches square.

For convenience, the above relationship for the 25x38-500 basis has been charted as illustrated in Fig. 4. Also in Fig. 4 will be found the a.d. basis weight for any sheet weight, oven-dry, or air-dry. The latter chart is convenient for checking weights.

Disintegration

The agitation in the proportioner has been provided with the sole objective of turning over the stock for uniform measuring purposes. It is not designed for breaking samples of pulp sheets for initial strength purposes, although it may be used in that manner if desired.

It would be possible to develop a standard procedure for this purpose but the matter has not yet been studied sufficiently to warrant definite recommendations.

For the time being, the most satisfactory procedure is to fill the proportioner to the 7.5 gram mark (2,840cc.) with fresh water and raise the draft tube to the top. Start the agitator and throw into the proportioner, piece by piece as torn, approximately 35 oven-dry grams of pulp, preferably at 20 per cent moisture or previously soaked. Keep the pieces moving with a paddle for about 30 sec-

onds and then leave the agitator running until the stock is defibered. Alpha sulphite will defiber perfectly in 2 minutes. Bleached sulphite (Port Royal) requires about 3 minutes. Unbleached sulphite (Hackman) requires at least 30 minutes. Hard pressed kraft pulps, groundwood, and soda pulps require longer in most cases.

It is doubtless possible to modify the agitator to improve the defibering characteristics, but too vigorous agitation impairs the accuracy of measurement and adds other difficulties which should be thoroughly investigated.

Samples of Known Weight

For certain purposes, particularly connected with pulp evaluation, the consistency of the sample will be known rather closely. A pulp testing beater, for instance, must operate at a uniform consistency if the beating action is to be reproducible. In such cases the sample size for the proportioner need contain only enough fiber for the required number of sheets. As will be described later, 4 sheets are recommended in most cases. These will require 10 grams of fiber for the sheets and an excess of one or two grams for slopping over in drawing samples and for excess in the bottom of the proportioner. It is not advisable to draw the last half inch of stock out of the proportioner. If the record sheet is dispensed with, only 8.5 grams need be taken for a sample.

The sample is placed in the proportioner and diluted with the proper amount of water, previously determined. After a few seconds agitation, the standard 898-cc. measure may be taken for the first sheet. The last two measures should be drawn in quick succession since the level in the proportioner falls below the agitator for the last measure. When the proportioning operation is eliminated in this manner, the average weights of different sets of sheets will vary considerably. However, each sheet of the same set will be same weight within about 1.4 per cent (total spread). The Mullen test sheet should be weighed (as described later) and, in this case, the physical test figures and the slowness reading should be corrected for weight.

The best method of diluting such samples in the proportioner is to put the water in first. Put in an excess of water, set the scale at the predetermined reading for the desired amount, and let the excess run out the draft tube. Then crank the draft tube to the top and put in the sample. The scale reading for the right amount of water is expressed by the following relationship, in which "W" represents the number of bone dry grams in the sample and "V" represents the volume of the sample in cc.:

$$\text{Scale reading} = \frac{21290}{W \times 358 - V}$$

The above relationship does not correct for wire loss in the sheet mould. It is recommended that for any particular type of stock, the first sample be diluted according to this formula and the scale reading used thereafter be adjusted to get the right sheet weight. The scale should be marked in case a standard practice along these lines is developed.

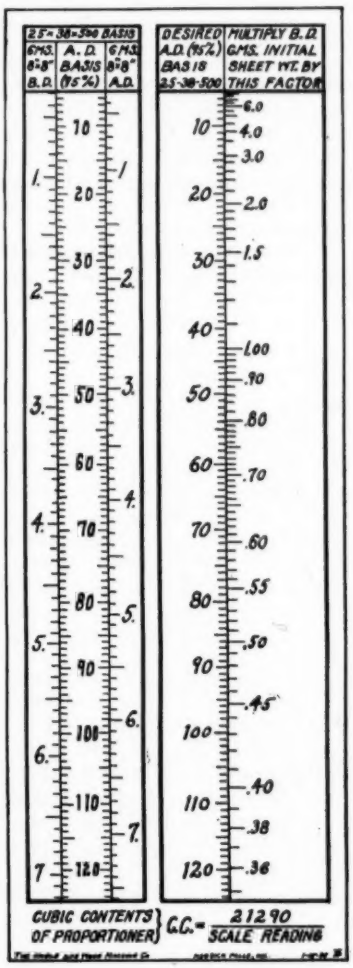

2.5-38-500 BASIS
GMS. 8"×8" B.D.
A.D. BASIS (75%)
GMS. 8"×8" A.D.
DESIRED A.D. (75%) BASIS 2.5-38-500
MULTIPLY B.D. GMS. INITIAL SHEET WT. BY THIS FACTOR
CUBIC CONTENTS OF PROPORTIONER
C.C. = 21290 / SCALE READING

Fig. 4

The Sheet Mould

The reproducibility of test sheets is very greatly influenced by the following factors:

1. Uniformity in the area of the sheets.
2. Condition of uniformity of stock distribution in the deckle box prior to sheet forming.
3. Condition of the forming wire.
4. Uniformity of water drainage through wire.

Sheet Area

The importance of uniform sheet area is understood when it is realized that the basis weight of an 8 inch square test sheet is altered by approximately 1.5 per cent by only 1/16 inch variation in the dimensions of the sheet. 1.5 per cent is not a great error in itself, but it should be eliminated since it is not the only factor influencing weight. Rubber gaskets bearing upon the wire frame and wire tend to change their size with age and swell in upon the wire when pressure is applied to seal the joint.

The deckle box in this design, which is made of approximately 0.091 brass, is brought clear down to the forming wire when the box is closed. The rubber gasket seals the joint between box and frame outside the wire. The clamp and the hinges are adjustable so the edges of the deckle box barely touch the wire and the size of the sheet is determined by the deckle box dimensions. This feature also has the desirable effect of providing no irregularities in the side of the box, near the wire, which tend to cause eddies in the stock as the sheet forms.

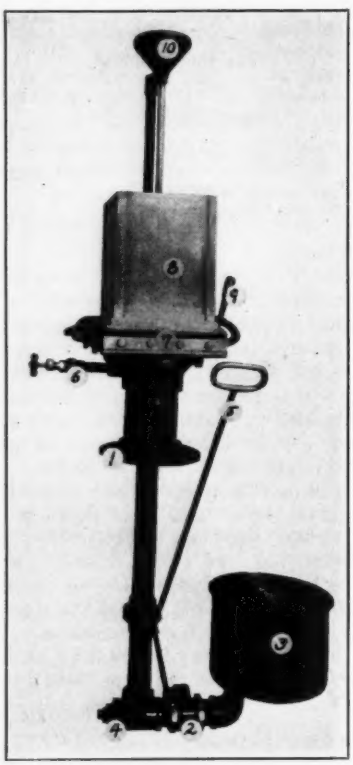
Condition in Deckle Box

The uniformity of the suspension in the deckle box has a very great influence on the weight distribution in the sheet. Even if the stock is perfectly uniform, the physical characteristics of the sheet, particularly tearing and folding strengths, are greatly influenced by any currents in the box during the time of formation. Agitators or stirring plates will give uniform results if carefully operated. However, their use in connection with this apparatus is

out of the question due to the ease with which the operator can handle the stirrer improperly.

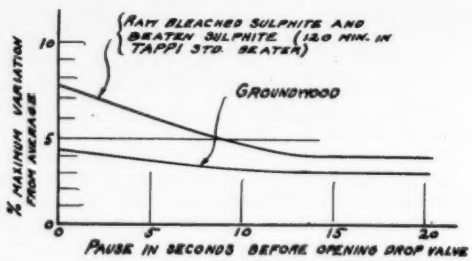
The method adopted in this sheet mould to obtain the proper condition of suspension utilizes the energy of a uniform quantity of liquid falling through a tube from a definite height into a uniform depth of water to provide the necessary dispersion of fiber. In order to carry out this method the mould is filled with water through the wire up to a definite point 8 3/16 inches above the wire which is adequately marked. The stock sample which has been previously diluted to a volume of approximately 1,900 cc. is then poured through the funnel into a ½ inch seamless tube 9¼ inches long. The above volume of diluted stock falling in this manner into the 8,600 cc. of water in the mould causes a very thorough turnover and dispersion of the entire volume.

It has been mentioned before that the proportioning measure has a volume of 898 cc. This is the measure that is used to draw stock from the proportioner for making sheets. It must be diluted to about 1,900 cc. since its volume is too small to create enough disturbance in the mould to insure adequate dispersion. Also, at the proportioned consistency, the fibers, particularly the long fibers, are pretty well engaged with one another and would remain partially engaged in clumps. By diluting to approximately 0.132 per cent the fibers are well separated before they are introduced into the mould. The resulting consistency in the mould is about 0.025 per cent. A pitcher of the proper size is provided for dilution of the 898-cc. measure



Sheet Mould

1. Base to be screwed to bottom of sink. 2. Drop valve—1¾ inch quick operative gate. 3. Sump—outlet of drainage pipe faces upward 4 inches above bottom of sump and 24 inches below backing wire. 4. Connection for metering pump if desired. 5. Drop valve handle. 6. Mould valve—fresh water inlet. 7. ¾-inch soft (not sponge) rubber gasket seals between deckle box and frame outside of forming wire. 8. Deckle box 11 inches deep. Standard stock depth is 10 inches above wire. 9. Deckle box clamp—secures box with single motion. 10. Stock funnel and tube. Pivoted on standard with stop for positioning directly over mould but can be swung aside for opening mould.



Influence of pause between introduction of sample and opening drop valve, in terms of weight distribution in the sheet.

Fig. 5

to 1900 cc. and a faucet is provided at the proper position in the sink.

The determination of the test sheet or deckle box dimension was largely influenced by this method of introduction of the sample into the mould. The method is not satisfactory with a round mould since the rotative action of the sample flowing through the funnel pipe sets up a swirl in the mould which requires a long time to subside. The square mould stops these swirls and the stock comes to almost perfect rest in about ten seconds time.

Pause Before Forming Sheet

Examinations made so far indicate that not less than 13 seconds should be allowed to elapse from the time the sample is done flowing through the funnel pipe to the time of opening the drop valve. If less time is allowed there is a tendency toward nonuniform distribution of weight in the sheet as well as variations in the total sheet weight due to nonuniform wire loss. If more than 25 seconds are allowed, settling begins. Variations between 13 and 25 don't seem to have any effect on the sheet. The time required to draw a sample from the proportioner, pour it into the pitcher, and dilute it is about 13 to 15 seconds. In the recommended procedure, outlined later, this operation is performed in the time between pouring in the sample and opening the drop valve, and is thereby used to measure the time of pause.

Weight Distribution

Weight distribution in the sheet has been examined by folding sheets to three thicknesses each way and then trimming in a good shear so as to obtain 9 squares of equal area. Each square was marked prior to folding so its location in the sheet was known. The squares were then weighed accurately on a chainomatic balance. This procedure was repeated on different types of stock and the curves in Fig. 5 show the maximum variation from the average in relation to the time of pause before opening the drop valve.

This method has the advantage of subjecting all types and conditions of fiber to the same formation influences. As noted in Fig. 5, groundwood forms better than sulphite with respect to uniformity of weight. The "look-through" also shows better formation. Free stocks will form "wild" test sheets just as they will give a "wild" formation on the paper machine. Slow stocks, particularly short stocks, will show perfect formation. This ability of the apparatus to bring out differences in the forming ability of different stocks is a very necessary feature when sheets are made up for design of furnish.

Condition of Wire

The necessity of keeping the forming wire clean is most

clearly brought to light in making of thin sheets. Dirt in the wire will influence the distribution of weight and strength of any sheet. The use of a forming wire fastened into the mould is undesirable. It is too difficult to clean when so arranged and too difficult to detect when it needs cleaning. Long fibered chemical pulps, beaten or unbeaten, and without sizing or loading materials have only a slight tendency to dirty up the wire. Soda pulp or conversion stocks are fairly clean. Groundwood is bad and paper machine finishes containing size, loadings, and very short fiber are much worse.

In this mould the wire is a loose piece of 9 inches square, 100 mesh, Monel metal screen. The corners are trimmed to approximately ⅜ inch radius. It is supported by a 16-mesh Monel metal backing wire of the same size (9 inches square). Outside of the backing wire, the mould frame presents a smooth surface flush with the backing wire and 10 inches square. As previously mentioned, the rubber gasket is attached to the deckle box. When the forming wire is laid upon the backing wire and the deckle box closed and clamped, the compression of the rubber gasket causes it to swell outward. It is restrained from swelling inward by the deckle box walls. This outward swelling grips the forming wire by the edges and straightens out all wrinkles or waves in the wire. The gasket forms a tight seal between the deckle box and the mould frame on the ½ inch of surface outside the edges of the wire. The make wire may be considerably out of position (as much as ¼ inch) without altering the situation.

Couching Eliminated

The couching operation, always a delicate task, is eliminated in this mould. When the sheet has formed the deckle box is opened, leaving the drop valve open. The pulp matt is ½ inch smaller all around than the backing and forming wires so the suction is broken the instant the box is opened. The wire is then picked up by its edges and, carrying the pulp matt, is transferred to the press. As will be described later, the matt is pressed and dried without removal from the wire so eight forming wires are supplied.

Cleaning the Wires

Drying the sheet on the wires tends to increase the speed with which they pick up dirt. However, dirt is distinctly apparent before there is enough present to effect the sheet properties. The wires are cleaned by dipping for about 10 seconds in a sulphuric acid solution, and then washing. The acid is contained in a lead box back of the sink. The box is 1 inch thick x 10½ inches wide x 11 inches deep with a hinged lead cover arranged in such a way that water can not be splashed into the acid. The cover is conspicuously marked as to the contents of the box and the method of use. A lead tray from the box overlaps the lead lined sink so the wires may be placed in the sink for washing, without dripping acid anywhere but in the sink. After cleaning, the wires are washed by placing them on the mould frame and running plenty of water up through them.

Since the acid box is on the outside of the bench, back of the sink, the wire cleaning operation is performed with outstretched arms and there is no danger of dripping acid anywhere but where it will do no harm. Properly designed tongs are provided for handling the wires. All eight wires can be cleaned at once in about one minute.

Wires should be cleaned for every 100 sheets (per wire) on long fibered chemical pulps free from size and filler. Groundwood or machine furnishes require cleaning for every 6 to 25 sheets per wire. Since there are eight wires, this means that the worst situation, so far as cleaning is concerned, can be taken care of by cleaning wires every 50 sheets. This is not considered objectionable in view of the adequate provision made for quick and safe cleaning.

Mould Drainage

The uniformity of the suction on the wire when the drop valve is opened is important in achieving good weight distribution. Air bubbles directly under the forming wire cause irregularities in the sheet. Surface tension is the explanation for this. The manner in which surface tension effects the drainage situation can be readily understood by observing how water leaves the wire of a Canadian standard freeness tester. The water does not fall in a uniform shower, but gathers together in streams. Surface tension forms, in effect, a funnel shaped skin or tube around these streams, particularly at their sources, down through which the water flows. This results in a suctional effect at the head of each stream which is added to the weight of the stock above the wire and increases the rate of drainage over the head of each stream. For a freeness tester, the pulp matt is exceedingly thick and the error thus introduced is probably not great. For test sheets, however, the effect is noticeable and must be avoided.

Bubbles under the backing wire have a negligible effect because the backing wire is nearly 1/16 inch thick and, being full of water, provides an ample channel for flow around the bubble. Bubbles are sometimes difficult to remove through a fine meshed wire attached to the mould frame. They are quickly and easily removed through the 16 mesh backing wire simply by slapping the forming wire down in its place and then quickly picking it up while the water flows up through.

Air bubbles are entirely eliminated from the picture by the following procedure; turn on the mould valve so water flows vigorously up through the backing wire and overflows the frame. Slap a forming wire in place. Pick up and turn it over. Slap it down again, pat it down so it is wet all over and, in general, below the surface of the overflowing water. Close the deckle box and clamp it. The deckle box is now filling with water and the mould valve may be closed when the level reaches the lower mark.

The backing wire is fastened to two clamping bars, each of which is engaged by four Monel metal capscrews on opposite sides of the mould frame (refer to photograph). By tightening these cap screws the wire is drawn tight as a drumhead across the forming space. Lead washers are used under the heads of the screws to prevent air leakage. This manner of holding the backing wire is sufficient to keep it from sagging under the 2 feet 10 inch standard head. However, in some cases greater suctions will be employed in a manner to be described later and on this account three knife-edges are provided under the backing wire in such a position as to support it for greater suctions.

Below these knife edge bars the mould frame contains a false bottom which is 1⅛ inch below the bottom of the backing wire. This false bottom has four 1 inch holes equally spaced so that each hole drains an area 4 x 4 inches directly above it. Below the false bottom a symmetrical chamber connects the four 1 inch holes into the 1½ inch drain pipe. The mould valve connection for introducing fresh water leads into this chamber from the side. This arrangement provides for adequate equalization of the suction while the sheet is forming. As described above, the drop valve is always left open while the deckle box is opened. Since the equalization chamber and drain pipe are automatically vented by this operation, the water level immediately drops down clear to the level of the sump. Fresh water is introduced from above and, since there are

no air pockets in the system, it fills up the drain pipe first. This is an important feature with slow or short fibered stocks containing filler since it eliminates the possibility of the whitewater, from previous sheets, changing the characteristics of sheets to follow.

It might be desirable for certain investigation purposes to reuse the whitewater. The problem is not simple, but it can be done with certain special apparatus. For general sheet making purposes the effect of whitewater should be eliminated.

It will be noticed that the drop valve is placed at the bottom of the drain pipe. This is done for a very practical reason. Valves have stuffing boxes which will leak air when under suction. The leakage is not noticeable, and on slow stocks interferes with the uniform drainage of the mould. The valve placed at the bottom of the pipe is always under pressure. Water leakage is noticeable and, even if it takes place, can cause no irregularities in the sheets.

Wire Mesh

The selection of 100-mesh for the forming wire was made after numerous experiments with meshes from 60 to 200. Since the sheet is dried on the wire, it carries a distinct wire mark. At 100-mesh the mark is very fine and not capable of interfering with the reproducibility of the paper test results. At 200-mesh the mark is scarcely visible to the naked eye, but 200-mesh wires are too floppy to handle and too easily damaged. 100-mesh produces a good finish and is thoroughly practical. Monel metal is used since it stands the cleaning acid well and resists bending and crimping better than bronze. In case a wire is damaged or badly dented, it may be straightened simply by passing it several times through the press with all the weights on and no felt. After straightening in this manner it must be trimmed to the original dimensions.

Mould Suction

The 2 foot water leg has been adopted as standard. This provides ample suction to drain the deckle box quickly enough to avoid the effects of settling. The method employed in this case begins with a forming pressure when the drop valve is opened of 2 feet 10 inches of water or approximately 1.2 pounds per square inch. This is a static pressure but as soon as the drop valve is opened and water begins to flow, the pressure is reduced by the resistance in the drain piping and the decreasing head above the wire. A scondary influence is introduced by the inertia of the column of water which reduces the forming pressure when the sheet begins to form, and by its momentum which increases the pressure at some later moment when the pulp matt has built up sufficiently to retard the rate of flow.

The actual curve of forming pressure is decidedly different for stocks of different slowness and forming characteristics. However, it is always the same when the same stock is used. Since the purpose of the apparatus is to show up differences in stock samples, it is more important that each sample should be subjected to the same basic influences as to forming, than that each sample should be formed under the same constant forming pressure or in the same length of time.

It might be possible to form a sheet under constant pressure. The apparatus would be cumbersome and impractical. The advantages of so doing are questionable.

It is practical to form sheets at a constant forming time, (within the limits of slowness) and, for the benefit of those who wish to do so, an extra piece of apparatus has been arranged and proven out. This method is not recommended as standard practice, but only for certain special purposes in connection with research. The apparatus consists of a special, eelctrically driven, metering pump which is connected into the bottom of the drain pipe at the point indicated on the accompanying photograph. This pump is capable of handling the whitewater with a negligible slippage at increasing suctions. It is equipped with a special bypass valve which can be adjusted to limit the suction to any desired maximum between 1 and 14 pounds per square inch. The discharge of the pump is delivered into the sump. In the use of the apparatus, the operator, instead of opening the drop valve, turns on the pump.

The metering pump can be provided so as to empty the deckle box in a fixed time of 15, 30, or 60 seconds, or with a variable speed drive to empty it in any desired time. With a pump arranged for 30 seconds forming time it will be found that standard weight sheets of very slow stock may be formed in a uniform time. If the stock is so slow that the forming pressure, at the established forming speed, exceeds the maximum suction of about 14 pounds, then the bypass valve will function and maintain the suction at the maximum but uniformity of forming time will be lost.

This pump may also be used to speed up the formation of exceedingly slow stocks or extra heavy weight sheets in order to prevent settling in the mould. The settling tendency of unloaded pulp is negligible up to at least one minute forming time. Sheets of standard weight and almost any commercial slowness will form with the standard 2 foot water leg provided within 60 seconds. Head box stock from any fourdrinier machine, except those used on cigarette papers and the like, will form a sheet of the same weight as the machine is running on within 90 seconds and usually much less. In cases where extra thick sheets are desired for study of stock properties in relation to physical characteristics of board it is not recommended that the whole sheet be formed at once. The board should be built up of separate plies just as is done in a cylinder machine. The method of doing this is discussed later.

The Slowness Reading

The only purpose in taking a slowness reading on this equipment is to provide a figure on this characteristic of the pulp that will be useful in predicting the rate of drainage on the machine wire. Obviously, a true correlation can not be arrived at except on head box samples, which contain the circulating whitewater, and in such cases no prediction is necessary. Nevertheless, we are measuring drainage time to predict drainage time, and it is logical to expect a fair degree of correlation between the drainage time in the mould and the drainage time on the machine wire.

An "Eastman" timer is provided and conveniently mounted. The timing button is connected to the drop valve so the motion of the valve in opening starts the timer. It is stopped by hand the moment the sheet shows "dry" on the forming wire. The end point is very definite. It is recommended that the timer be started and stopped for three successive sheets and the total time in seconds taken as a reading. This makes each reading proportional to an average of three tests. Taking of the slowness test reading on a sample requires no additional time over that required to make the sheets without taking the reading.

All slowness testing must either be done under standard conditions of temperature and fiber weight, or else corrected for these factors. In this case there is no correction for weight since the sample has been accurately proportioned in advance. For pulp testing and other laboratory purposes a temperature correction is recommended and a simple correction sheet supplied. For control purposes it is recommended that the fresh water supplied to the mould be drawn from the mill supply water, with

whatever precautions are necessary in each installation, to assure reasonably similar or proportional temperatures of the supply water and the stock in the head box.

The drainage time of pure water at 58 deg. F. is 5.1 seconds. This gives a slowness reading of 15.3. This type of slowness reading is not particularly sensitive on free stocks since a raw bleached sulphite (Port Royal) shows a reading of only 17.2. Fig. 6 will serve to give some idea of the range of the slowness reading in terms of the beating time in a TAPPI standard pulp testing beater.

The suggestion of an additional method and apparatus for measuring slowness is introduced in this report with some hesitation. However, considering the numerous methods and instruments now in use, the addition of one more will not appreciably confuse the situation further. If it is desired to measure slowness or freeness by some particular separate instrument, then it is only necessary to provide a measure of the proper size. The desired amount of fiber for that instrument can be drawn after proportioning and no weight corrections need be made on the instrument reading. Since proportioning requires only 2½ minutes, accurate freenesses may be obtained very promptly and without bothering to save and weigh the pulp matt from the instrument.

The Press

Pressing of test sheets has generally been done heretofore by direct pressure between flat plates. Water removal from the wet matts has been accomplished either with felts or blotters. This method requires handling and stacking of pulp matts and felts or blotters. If reproducible results are to be expected, great care must be taken regarding the rate of application of the pressure and generally two pressings with fresh blotters are required. The felts or blotters must be uniform in their water absorbing properties and in their thickness. Application of pressure must be uniform over the entire sheet area. If blotters are used, as is the case with the more accurate methods, they must be kept on hand in proper containers and supplies of the same material always available.

All this involves an amount of time and care that, while suitable for some laboratory purposes, is out of the question for practical sheet making purposes.

The purpose of a press for test sheets is to subject every sheet and every part of the sheet to the same water removing and compacting influences. It is to be expected that after pressing, heavier sheets will carry less moisture percentage than light weight sheets and that raw fiber will carry less than hard beaten fiber. This is exactly what happens on the paper machine.

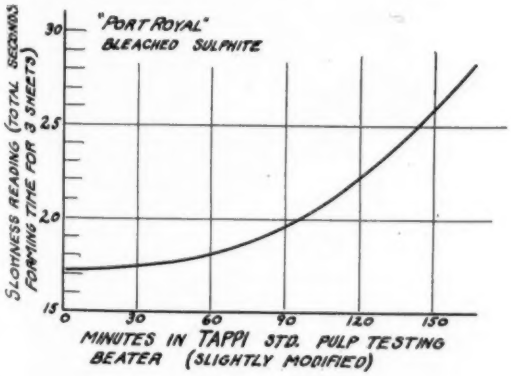
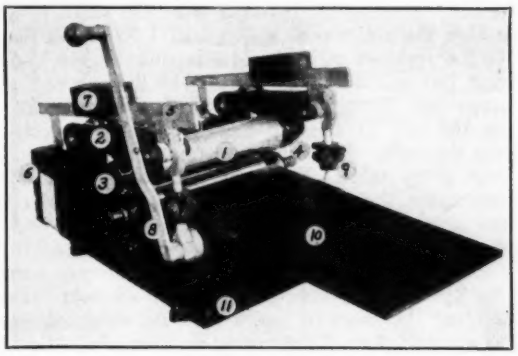


FIG. 6



THE PRESS

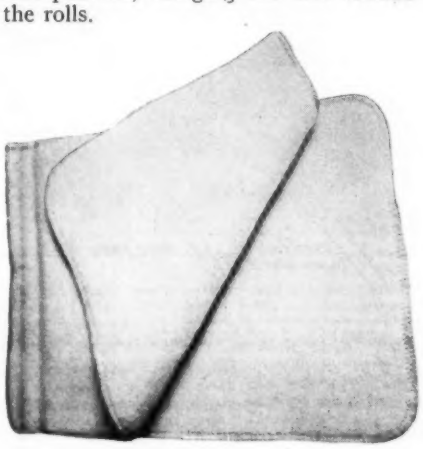
1. Press rolls. Stainless steel accurately finished 3-inch diam. x 12 inches long. 2 Press arms—double ball bearing journals. 3 Precision self aligning ball bearings on roll journals. 4. Projecting drive shaft on bottom roll. Driven drom drier motor at 7.4 r.p.m. 5. Weight beam. Compounds leverage to 30 to 1. Double ball bearing. 6. Three 5-pound weights. Each represents 150 pounds on journal. 7. 5-pound adjustable weight engages notches in beam representing 0 to 150 pounds on journal in 20 steps of 7½ pounds each. 8. Lift lever. Separates rolls by ½-inch when up. Moves to stop in horizontal position, applying maximum load of 1200 pounds between rolls with 10 pound pressure on handle during last 4 inches of movement. 9. Beam leveling adjustment swivels. 10. Micarta front table. Rear table same but shorter. 11. Cast iron base with sump under rolls and 1-inch drain connection.

The press designed, according to the illustration, is a development of the clothes-wringer idea, which has been employed with moderately satisfactory results by several test sheet investigators. A study of the shortcomings of the clothes-wringer has resulted in the development of the various features of this press.

Press Felt

The press felt is a specially woven, very high grade virgin wool felt designed to carry a large amount of water and yet not mark the sheet, when used between small metallic rolls. It is 10 inches wide and folded and stitched with the bottom flap 16 inches long and the top flap 14 inches long.

When the press lever is up, the rolls are separated by ½ inch. The bottom roll is running all the time. The felt is laid centrally on the front table and the stitched end is tucked between the rolls. The top flap is then thrown over the top roll. When a wet matt from the sheet mould is to be pressed, it is laid with its forming wire centrally on the bottom flap and the lever is brought down. The last 4 inch movement of the handle brings the compound leverage into action and the beams lift to a horizontal position, bringing the full desired pressure between the rolls.



PRESS FELT

The felt, carrying the forming wire and matt, progresses through the roll nip at a speed of 1.16 inches per second or 5.8 feet per minute. The top flap is not laid over the matt but is allowed to carry over the top roll as the felt progresses through the press. The press lever is lifted just as the last of the top flap of the sheet disappears between the rolls. The felt and pressed sheet are now on the rear press table. They are picked up and laid on the front table, the seam is tucked between the rolls again, and the press is in position to receive the next sheet.

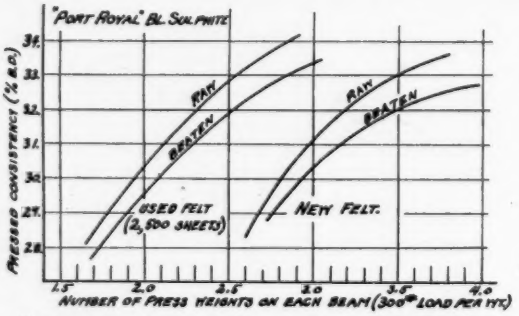
The time for passage of the felt between the rolls is approximately 11.0 seconds. The time for one complete pressing operation is approximately 18 seconds including transferring the sheet to the dryer. Actually, no time at all is consumed since the pressing is done while the mould is filling for the next sheet and an operator can form the sheets, press them, and put them in the drier at the same speed that he can form the sheets alone. (Approximately 55 seconds per sheet on free stock).

The most important single factor in a rotary press is the condition of the pressing medium, or felt. A new felt requires a heavier pressing load to remove the same amount of moisture than a used felt. This is probably because a new felt is more springy and increases the effective pressing area between the rolls, thereby reducing the unit pressure on the sheet. In a practical, pressing operation, the same felt must be used for a long time and some adjustment must be made to offset its changing characteristics.

Early in the development, the assumption was made that, with a rotary press employing a wet felt, compacting of the sheet and removing water are one and the same thing as far as finished properties are concerned. In other words, it was assumed that if two identical wet matts were taken, one pressed with a new felt and a high pressure, and the other pressed with an old felt and low pressure to the same pressed consistency, the two sheets would have identical physical characteristics. This assumption has been proven to be correct for practical purposes.

Press Calibration

It is necessary, therefore, to establish some basis for expression of the degree of pressing action and a means of adjusting the press weights from time to time as the felt gets older and dirtier. The adjustment has been referred to earlier as "calibration of the press." The standard pressing action has been determined upon as the combination of felt condition and press weights that will press a wet matt of unbeaten, long fibred sulphite containing 2.5 grams of bone dry fiber, to a pressed consistency of 32 per cent o.d. It is not necessary to specify the type of pulp any closer than the above. Bleached and unbleached sulphite are apparently exactly the same. Soaking of the pulp prior to use makes no difference. Even a small amount of beating makes very little difference. Short fibered (hardwood) sulphite should not be used. Kraft pulps have not been experimented upon in this respect.



Relationship between pressing load and pressed consistency for new and used felts on raw and beaten (2 hrs. Tappi Std. beater) bleached sulphite.

Fig. 7

The easiest way to calibrate the press is to defiber in the proportioner, after the manner previously suggested, a batch of soft bleached sulphite. This requires only about 4 minutes. Proportion the batch and make a standard weight sheet. Adjust the press weights at the best guess as to the proper weight to get 32 per cent consistency with felt being used. Press the matt, strip the wet sheet from the wire, weigh it wet on the scales, bone dry it, on the hotplate, weigh it bone dry, and calculate the pressed consistency.

The wet weight of a standard weight sheet at 32 per cent is 7.83 grams. If the wet weight is greater than 8.00 grams or less than 7.6 grams it is unnecessary to bone dry the sheet and calculate the pressed consistency. Adjust the press weights as indicated by the previous results and make and press a second sheet. Check this sheet in the same manner and repeat the operation until three successive sheets have been pressed to a consistency ranging between 31.5 and 32.5. Press calibration requires about 15 to 20 minutes time.

Fig. 7 illustrates the effect of the pressing weight on the pressed consistency for standard weight sheets of raw and of beaten bleached sulphite. For convenience, the pressing weight is expressed in terms of the number of 5 pound weights on each beam. As previously explained, the weights are adjustable by twentieths and each 5 pound weight corresponds to 150 pounds on the respective top press roll journal or 300 pounds pressure between the rolls.

Care of the Felt

If the felt is properly taken care of, the press need not be calibrated frequently. An air tight container is screwed to the bench beside the press and the felt should always be kept in that container when not in use. It should not be allowed to dry out. If accidentally left out of the container for a time, it should be thoroughly wet, wrung out by hand, and run through the press at least five times. Recalibration is not necessary.

If size and loadings are contained in the stock sample, the felt should be thoroughly scrubbed at least every 250 sheets. After scrubbing, it must be recalibrated but should be run through the press at least 20 times before doing so. The advisability of dry cleaning has not been investigated. Clean chemical pulps are easy on the felt and its condition need be checked only every 300 to 500 sheets or every week. While calibration of a new or washed felt may require 15 or 20 minutes, checking of the felt can be accomplished at any time when fairly raw sulphite sheets are being made. This requires only about two minutes' time. An extra sheet is made from the sample run and is used for a check on the pressed consistency.

In general, the press should be calibrated about once a week unless the felt is mishandled. It is best to continue the use of one felt for as long as it can be washed and kept in condition so it will give 32 per cent pressed sheets at not less than 1.5 weights per beam. This may be a matter of years. When a felt is sufficiently compact to calibrate at 1.5 weights it is liable to introduce crushing effects on slow stocks. In actual practice, keeping the press in proper calibration has been found to be practically no trouble at all.

The reader is expected to be somewhat skeptical as to the statement heretofore made that felts having different

water removing properties, and requiring widely differing loads to bring the pressed matt to the same moisture content, will produce similar test sheets. The following table (Fig. 8) gives the results of an experiment conducted to bring out this point.

FIG. 8

Felt	Pressing Load (Pounds)	Raw Bl. Sulphite Pressed Con.	Raw Bl. Sulphite Burst	Raw Bl. Sulphite Tear	Beaten Bl. Sulphite Pressed Con.	Beaten Bl. Sulphite Burst	Beaten Bl. Sulphite Tear	Beaten Bl. Sulphite Fold
Used	570	31.9%	5.7	29.5	31.1%	29.6	24.3	44.7
Washed ..	600	32.0%	5.5	31.1	31.3%	31.3	24.6	40.3
New	960	32.1%	6.3	30.2	31.1%	31.0	22.3	46.0

The press was calibrated for each felt on raw sulphite for 32 per cent pressed consistency. A sample of raw sulphite and one of beaten sulphite (2 hours in TAPPI Standard Laboratory beater) was then run through for each felt. One sheet from each sample was used for checking the pressed consistency and four sheets were put through the drier, conditioned, and tested for burst, tear and fold. The "used" felt had been in service for 6 weeks and had pressed approximately 2000 sheets. The "washed" felt was the used felt after thorough scrubbing with hot water and soap. The "new" felt was perfectly new and was wet up and run through the press four times before use. Notice that the pressing loads required to calibrate the press for these felts ranged between 570 and 960 pounds.

It is conceivable that pressing successive sheets of different weights might cause variations in the pressing effect on account of different amounts of water carried to the felt by the sheets. If so, inaccuracies would be introduced in the first standard weight sheet of every sample since the initial, or proportioning, sheet is always heavy. This matter has been investigated and no trend is found. A 2.5 gram sheet will be pressed to the same consistency regardless of the weight of the sheet immediately preceding it.

Since the pressing operation begins at one end of the sheet and progresses forward, water flows forward through the felt. The last of the sheet to pass between the rolls might be expected to contain more water than the first. This is not the case. All parts of the sheet have been found to contain the same proportion of water. This is probably on account of the fact that the very slow pressing speed of only 5.8 feet per minute allows ample time for the two laps of the felt, and the pulp matt to come to an equilibrium as to their respective capacities for holding water at the pressure applied. Faster pressing speeds have been used and found not so satisfactory from this standpoint.

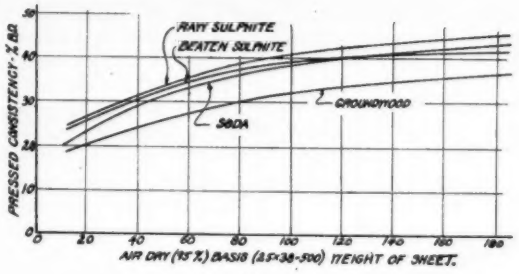


FIG. 9

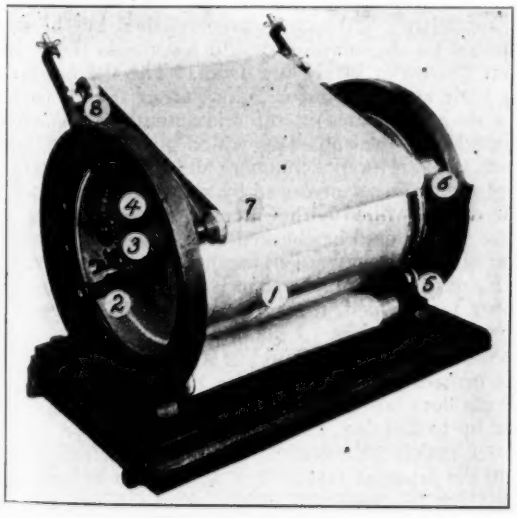
The presence of the forming wire on one side of the pulp matt causes the pressed consistency to be lower than it would be without the wire. Since the wire is always used the effect is of no particular importance. However, the presence of the wire is indispensable in keeping the matt straight and uniform during the operation and as a vehicle for carrying the matt to the press and from the press to the dryer without distortion.

All experiments to date indicate that the press does not introduce any "machine direction" to the sheet. If there is any at all it is very slight and will be detected only by the most careful investigation.

Fig. 9 shows the reaction of various types of stocks to this pressing action in terms of varying sheet weights.

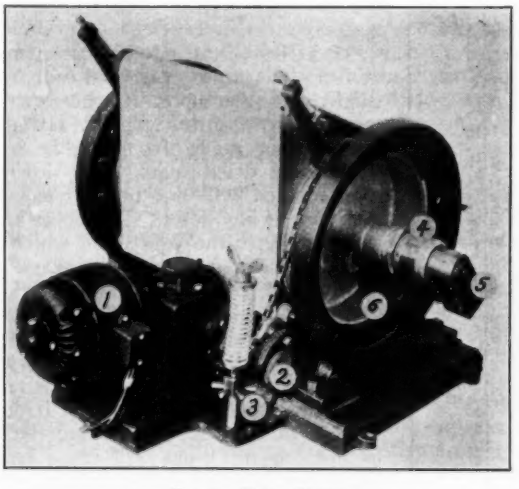
The Drier

Drying test sheets is the most important step in the process. If tearing and folding strengths are to be repro-



DRIER—FRONT VIEW

1. Drier drum. Seamless steel tubing, finished 12¾ inches o.d. x ⅞ inches thick with electric welded heads and internal baffles. Hydrostatically tested at 100 pounds per square inch pressure. 2 Safety valve set at 60 pounds pressure. Baffle cover (not illustrated) reverses direction of blow into drum head. 3. Water supply valve. Union connects to fixed supply pipe for purpose of filling drum. 4. Level valve. Drum is filled with water to level of this valve when in highest position. 5. Ball bearing flanged rollers on which drum turns. 6. Seamless brass felt rolls on ball bearings. 7. Porous woolen drier felt woven endless 16 inches wide. 8. Felt adjusting roll.



DRIER—REAR VIEW

1. ¼ h.p. motorized speed reducer with double ended driven shaft. End shown drives drier. Other end drives press through extension shaft and double flexible coupling. 7.2 to 7.4 r.p.m. depending on frequency. Connects to electric load center with lead sheathed flexible cable. 10 ampere (for 110 volts) circuit-breaking switch. 2. Drier drive clutch. Engages for large or small proportion of each shaft revolution depending on adjustment. Transmits intermittent rotation to drum. 3. Drying time adjustment nut. May be adjusted while running to any drying time from 0.57 minutes to one hour. 4. 3000-watt immersion heater. 5. Slip-ring unit. Connects to electric load center with 3 wire, lead sheathed, cable. 30 ampere (for 110 volts) circuit-breaking switch. 6. Thermostat on heater. Regulates water temperature inside drum between 140 deg. F. and 260 deg. F. with 2 degrees differential. Externally adjustable with indicator.

ducible, every part of the sheet must be dried in the same manner. Shrinkage of the sheets in drying causes great variation in these physical properties as well as others. If free shrinkage is allowed, the sheet will cockle and warp, particularly from mechanical treated stock. Reproducible results can be obtained only by a large number of test sheets from each sample. In a rapid process, there is not time to make a large number of sheets. Furthermore, the drying time is a matter of at least an hour and generally overnight. In addition to these disadvantages, sheets must be dried in conditioned atmosphere.

Restraint of the sheets by clamping the edges while drying, either to eliminate shrink or to reduce it, only adds another difficulty. The range of moisture content where shrink takes place is relatively narrow. Some parts of the sheet are sure to arrive in this range before other parts, either on account of slight variation in weight, slight variation in the pressed consistency, or variation in the air currents over the sheet, which carry away the moisture. The portions which begin to shrink first draw upon the portions which are still too weak with moisture to offer resistance. The result is, strong and weak spots in the sheets.

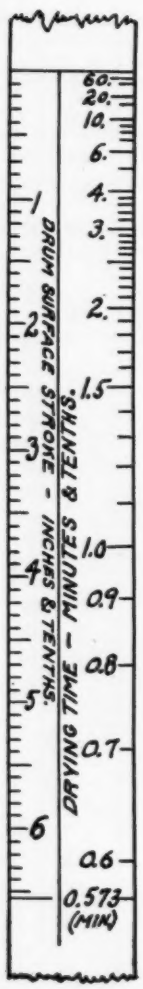


FIG. 10
Drying Time Measuring Scale

The only feasible way to dry a test sheet rapidly is to completely eliminate the shrink from all portions. This means that no portion of the sheet must move in the slightest degree with relation to other portions. The pressure of a tightly drawn drier felt across a hot curved surface upon which a wet sheet is laid will not prevent shrinkage of highly beaten fiber, particularly if the sheets are thick. Pressing the sheets onto a polished, hard surface and air drying with edges clamped, successfully meets the requirement in most cases. However, time again comes into the picture besides, some uncertainty as to whether relatively thick sheets of beaten fibers adhere tightly to the surface at all points.

If a sheet is dried without removing it from its forming wire and with a very slight pressure upon it, there will be positively no shrinkage. A 100 pound basis sheet made from highly beaten stock and dried quickly or slowly by this method will not break loose from the wire at any point. The fibers adhere tenaciously to the wire upon which they were formed. If a high shrinkage sheet is stripped from its forming wire and then laid back upon it and dried under the same conditions, shrinkage will take place. If such a sheet is dried without loosening it from its forming wire and without a slight pressure upon it, it will adhere to the wire (providing the wire is not too stiff) but will cause both to curl.

A high shrinkage sheet dried on its forming wire against a flat, hot, surface with a slight pressure upon it will cause the wire to curl slightly when the pressure is removed after drying. This is because tension is set up in the sheet due to its inability to shrink during the last stages of the shrinking range. It still adheres tightly to the forming wire so the tension is uniform at all points. When it is stripped from the forming wire it lies perfectly flat.

Sheets dried in this manner may be easily stripped from the forming wire unless they contain large amounts of size, loading, or very fine fiber, or unless they are exceedingly thin (10 pound or less). The only sheets which cause any trouble in stripping from the wire after drying are 20 pound basis or less containing weak fiber and large amounts of loading, and 10 pound basis or less of such stocks as cigarette paper furnish. Any standard weight sheet (43.1 pounds) strips off readily.

The logical answer to the rapid sheet drying problem is a heated drum with a porous drier felt. The temperature of the drum must be under control; and the time of exposure of the sheet to the drum must be uniform and of the proper length. This latter requirement calls for a power driven drum with a variable speed drive.

The accompanying photographs and descriptions are self explanatory. The rotation is upward on the front side of the drum. The edge of the forming wire, which carries the pressed sheet, is tucked in the nip between the drum and the top run of felt, forming wire against the drum and sheet against the felt. As the drum rotates, it carries the wire and sheet around and delivers them from the bottom run of felt into a suitable basket attached to the bench.

The felt wrap around the drum is 27 inches. The drying time is adjusted to the point desired by measuring the movement of the drum surface per each stroke, or engagement, of the clutch. Since the drive shaft turns at 7.2 r.p.m., the proper stroke for any desired drying time in minutes is expressed by the following relationship:

$$\text{Stroke in inches} = \frac{3.75}{\text{Desired drying time in minutes}}$$

The stroke may best be measured by pressing a scale horizontally on the drum surface and measuring the amount of movement in relation to a stationary pointer. Such a scale and pointer are provided (not visible in illustrations) and the scale is calibrated in minutes drying time. The scale calibration is illustrated in Fig. 10.

Temperature regulation is accomplished by the adjusting button on the thermostat, which controls the temperature of the water inside the drum. The thermostat carries a scale and pointer for indication of the temperature. The scale is calibrated in reference numbers. A chart is furnished with the apparatus which gives the relationship between these reference numbers and the surface temperature of the drum as measured by a surface pyrometer.

The drum is filled with water up to the overflow valve and the level should be checked once a week. It must not be full since the water contained, in warming up to 250 deg. F., expands by more than a quart and unless an air chamber is provided, the safety valve will drip water as the temperature rises. Leakage of the safety valve impares its tightness and should be avoided. The air chamber is provided the right size so that the pressure inside the drum does not rise over 35 pounds when cold water is heated up to 250 deg. F.

Water makes an excellent heat reservoir and supplies heat to the drum as fast as it is withdrawn in heating and evaporating the moisture in the sheet. Since the drum shell is uniformly 5/16 inch thick, the surface is maintained at practically the same temperature as the water inside. The air space at the top of the drum retards heat transfer from the water to the drum surface at this point. However, the effect is uniform on successive sheets and represents a small portion of the drying time.

The standard drying temperature (for 2.5 gram sheets) has been established at 180 deg. F. The standard drying

time is 3.0 minutes. An infinite number of time and temperature combinations are possible and further study of drying factors may indicate that some different combination is better. For the time being, 180 deg. and 3.0 minutes appear to be very satisfactory and are recommended for standard weight test sheets.

Moisture

It will be noticed from Fig. 11 that sheets are not delivered from this drier in a bone dry condition. They contain a minimum of 2.5 per cent moisture no matter how long the drying time may be. At a drying time of 3.0 minutes, all sheets have reached the same moisture content. The higher the drum temperature, the lower is the moisture content. It would likely be possible to use a sufficiently low drum temperature to bring the moisture up to around 4 or 5 per cent but the drying time would be excessively long. Also variations between the moisture content of sheets made from different pulps should be expected to appear to an appreciable extent. 180 deg. F. has been selected because it fits in nicely with the rest of the sheet making procedure. The drying time of 3 minutes allows the operator ample time to get his fourth sheet into the drier before the first sheet is delivered to the basket. The wet part of the work is all completed and he can attend to the testing the sheets as they come out of the drier.

For practical purposes, and, with good technique, for exacting purposes, these sheets can be tested for burst and tear immediately on their delivery from the drier.

The question may be raised as to whether the drier felt picks up moisture and might influence the drying of a sheet which happened to be placed on the same portion of the felt as a previous sheet. Successive sheets have been dried on the same portion of the felt each time that spot came around. The moisture contents at delivery from the dryer were identical. The felt is 80 inches long and, at the standard speed, requires 9 minutes to make one revolution. The fact that a stable sheet moisture is reached after 3 minutes drying time (at 180 deg. F.) indicates that the felt must become stabilized also.

Machine Direction

Some machine direction is apparently introduced by the drying operation. It can slightly be detected by the tearing test or by tensile or stretch tests. The folding test brings it out more and indicates a definite and uniform machine direction. Experiments have been conducted which definitely place the responsibility for this on the drier. The direction of greater strength with reference to the rotation of the drum is the same as that of commercial sheets on a paper machine. The explanation is that the wet matt adheres to the forming wire and since the wire is curved around a 6 5/16 inch radius, the matt is stretched one way before drying.

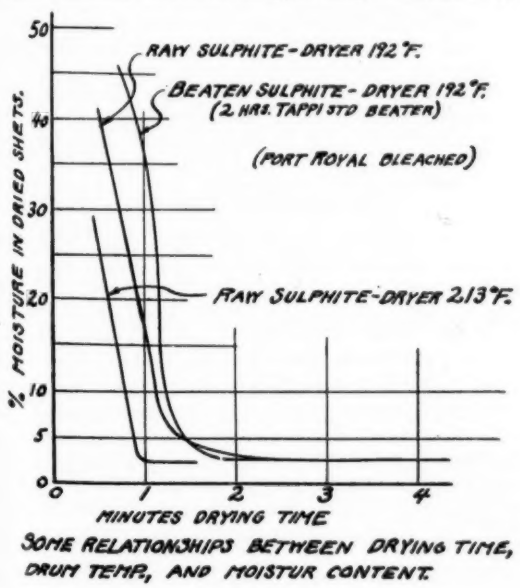


Fig. 11

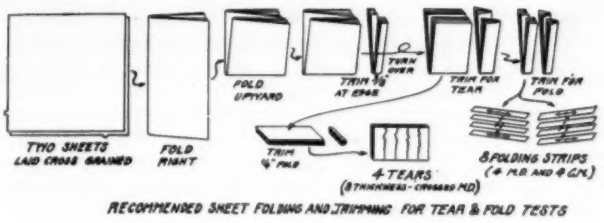


Fig. 12

In order that the machine direction of a sheet may be known, there is a niche in the sheet mould near the front, right-hand corner. This niche produces a tab about ⅛ inch long and ⅛ inch wide at the same position on the edge of the sheet. Sheets are always laid on the press with the tab forward and put into the drier in the same position. The tab also serves to mark the felt side of the sheet. If the sheet is laid down with the tab on the near edge and close to the right hand corner, the felt side is up and the tab points the machine direction.

Drying Heavy Sheets

The standard drying time is based on drying standard weight sheets (2.505 grains o.d.). When it is desired to dry heavier sheets the drying time must be increased approximately in proportion to the weight of the sheet. In other words, if a 150 pound (25 x 38—500 sheet is to be dried, the time should be increased to approximately 10 minutes. Such sheets should not be underdried and, since a condition of equilibrium is reached at around 2¾ per cent moisture, it is better to allow an excess drying time. Passing a heavy sheet several times around the dryer at standard drying time its not recommended since the sheet is apt to free itself from the wire and shrink.

Sheet Testing

Testing of sheets immediately upon delivery from the drier requires some specification as to how they should be handled. The increase of moisture between the time of leaving the drier and the time of testing is measurable. However, tests made at varying times up to 6 minutes out of the drier have failed to show any change in the burst or tear tests.

Mullen Test

Take the first sheet from the drier before it drops into the basket. Pop 10 times and record the average reading. Oven dry the sheet and record the oven-dry weight as a check on the proportioning operation.

Tearing Test

By this time the second sheet will be in the basket. Leave it there until the third sheet is free of the drier drum. Then take both sheets and lay them on a table with the machine directions crossed. Fold and trim according to Fig. 12. Make 4 tearing tests (8 thicknesses) and record the average tear. 4 thicknesses will be m.d. and 4 will be c.m.

FOLDING TEST

It is recommended that the sheets be conditioned before this test is made. However, if no uniform conditioning room is available, more reproducible results will be obtained by testing immediately than by conditioning under varying temperatures and relative humidities. Take the folding samples from the 2nd and 3rd sheets according to Fig. 12. Make 8 tests and record the average. Half will be m.d. and half c.m.

RECORD SHEET

By the time the Tearing test is completed, the 4th sheet will be in the basket. This was the last sheet made and is the record sheet for future reference if necessary. Mark upon it the properties already recorded of the slowness, weight, burst, tear and fold.

Four more sheets are available, if they are desired for other tests than the above. If more than four sheets are made, it is recommended that the last four be used for the above purposes. In other words, if 3 extra sheets are desired make 7 sheets in all. When the sheet making is finished, the first 3 will already be in the basket. Set them aside as the extra sheets and take the 4th sheet for burst, etc. The last sheet made will be the record sheet. By this method, all the wet work is done at once and the physical tests are run on sheets that have been out of the drier the usual time. It is not necessary to correct the physical tests for the weight since the weight variation, as previously explained, is very slight.

Calendering Test Sheets

For some purposes it is desirable to calendar test sheets. The Press, previously described, was designed with calendering in mind. It is understood that the calendering effect of the hot rolls of a machine stack and the frictional factors will be difficult to duplicate. However, the Press can be used as a calender and has the advantage of perfect control over the calendering pressure. Preliminary experiments have been made and the following method is tentatively suggested.

Dry up the press rolls and tables. Set the beam adjustment nuts up so the weights are suspended when the press lever is down. Leave the lever down and run several paper towels or other sheets through, one at a time, to thoroughly dry the rolls.

Take two sheets of 35 pound book paper 8½ x 11 inches. Lay the test sheet centrally on these two sheets. Start the assembly between the rolls and as soon as it has caught, lift the free end over and around the top roll. Press against the top roll with the hands while the assembly is going through. This keeps the sheets from wrinkling.

The operation may be repeated as many times as desired, turning the test sheet around 90 degrees on the carrier sheets each time. After four passes, turn the test sheet over and continue. The number of weights to use on the beams and the number of passes advisable will depend upon the finish desired.

Laminated Sheets

The study of various factors effecting the properties of boards involves the making of heavy sheets. It is recommended that such sheets be made in plies, rather than formed full weight in the mould. The plies should be of approximately the same weight as those of the cylinder machine upon which commercial board is made. A chart similar to Fig. 4 will be furnished for proportioning in terms of the trade standard basis weight. In this manner filler plies of any weight may be built up and liners of any weight added.

The recommended procedure is to make the liners first. Proportion the liner stock and form two sheets. Lay them aside without pressing. Proportion the filler stock and form and lay aside, without pressing, the requisite number of filler plies. Now lay the bottom liner, wire down, on the press felt. Reverse the first filler matt and lay it on top of the liner, wire up. Blow through one corner of the wire and peel it off the filler matt. Repeat this process with the balance of the fillers and the top liner but do not peel the wire off the top liner. Run through the press once with the lever loose for a light preliminary pressing. Run through the press a second time with the full calibrated weights on the arms. Remove the top wire and transfer to the drier.

By this method any desired weight of board may be made. A separate proportioning operation is necessary if the top and bottom liners are different. The adhesion between plies is practically the same as that on a board machine.

Detail Operating Instructions

Since the method of operation has been pretty generally covered by the foregoing paragraphs, it is not considered necessary here to add the move-by-move detailed instructions. These instructions have been prepared and printed. They are arranged for the use of an operator of ordinary intelligence and every hand movement is detailed and numbered. Corresponding to the numbered movements is a list of the precautions to observe, if any, in respect to each movement. In addition to this, instructions are furnished regarding the installation of the equipment.

While detailed operations are supplied, it is not necessary to follow them exactly. Many variations may be made without any effect at all upon the results. The instructions are provided because they describe a certain sequence of movements that have been found to be the most rapid in producing results. Each movement is simple and with a definite end point. By following these instructions, increase in the skill of the operator will improve his speed but will not alter the results obtained.

It has been found that a tour worker, whose duty it is to collect paper samples from each machine and test them for burst, tear, fold, ash, and size, masters the instructions after no more than three trials. Thereafter his sheet test results will agree with those of any other operator. In other words, about 1½ hours will "break in" a new operator whose results may be depended upon. During the next five or six samples he may make a slip or two in proportioning but will catch these himself from the check weighing of the bursting test sheet, and will run the sample over.

Reproducibility of Results

Fig. 13 speaks for itself. In these tests a separate sample was used by each operator and was proportioned by him. In each case four sheets were made and tested as recommended above (10 pops on one sheet and 4— 8 ply tears on two others combined). The operator made the burst and tear tests in all cases except one operator No. 5 who was unfamiliar with these instruments. The various operators are described as follows:

1. Laboratory assistant. Expert test sheet maker by another process and already experienced on this apparatus.
2. Nontechnical laboratory assistant. Never before made test sheets. 15 minutes instruction.
3. Technical worker—Laboratory assistant. Never before made sheets. 15 minutes instruction.
4. Mill chief chemist.
5. Coating mill superintendent. Never made sheets before. 15 minutes instruction.
6. Designer of apparatus.
7. Tour worker in test station. Never made sheets before. 15 minutes instruction.
8. Similar to 7.

FIGURE 13

Stock	Operator	Weight	Mullen	Tear
Unbleached sulphite, 60 min. lab. beater	1	2.53	34.0	20.5
	2	2.53	33.8	20.6
	3	2.50	35.0	18.9
	4	2.51	34.2	20.1
	8	2.50	32.1	20.9
Bleached sulphite, 150 min. lab. beater	6	2.53	27.1	17.3
	6	2.53	27.3	18.2
	3	2.50	27.4	17.0
Bleached sulphite, 30 min. lab beater	6	2.48	12.7	27.5
	6	2.48	12.7	27.2
	6	2.49	13.0	26.8
	6	2.51	13.1	28.7
	1	2.49	12.4	26.3
	1	2.52	12.7	26.5
	1	2.49	12.1	27.5
	1	2.48	12.2	25.8
Bleached sulphite, 150 min. 5 days old	7	2.47	23.5	15.8
	5	2.48	24.8	15.8
	4	2.50	24.4	14.7

In conducting an experiment of this type, extreme care is required in the selection and mixing of the samples or they will not be duplicates of one another. Pulp samples will change in a few hours sufficiently to effect the physical tests on the sheets.

The Human Element

Practical experience with this apparatus and the test method recommended indicates that no particularly high grade of intelligence or technique is required. Any person who can make reliable bursting and tearing tests on commercial paper can master the operations within two hours time, and obtain reproducible results.

Time Requirements

Any operator of two or three days experience can obtain reliable results from the following operations in the times given in the following table. By "free" stocks is meant stocks similar to unbleached sulphite after 1½ hours in a TAPPI standard laboratory beater. By "slow" stocks is meant the equivalent of headbox stock for a thin sulphite bond, fine groundwood and the like. The time figures given are necessarily approximate and the times for "free" stocks apply to the majority of pulp evaluation work.

Operation	Approximate Time in Minutes: Free Stocks	Slow Stocks
1—Proportion sample	2½	3½
2—Proportion, make one sheet, press, and place in drier	3½	5
3—Proportion, make one sheet, press, and dry	7½	9
4—Proportion, make 4 sheets, press, and dry	10	13½
5—Proportion, make 6 sheets, press, and dry	12	16½
6—Proportion, make 8 sheets, press, and dry	13½	19½
7—Proportion, make 4 sheets, press, dry, test burst and tear, check weight, and record slowness, burst, tear, and weight	11	14½
8—Same as 7 with 2 extra sheets	12½	17½
9—Same as 7 with 3 extra sheets	13½	19
10—Same as 7 with 4 extra sheets	14½	20½
11—Take sample containing a known amount of fibre, make 4 sheets, press, dry, test burst and tear, check weight and record slowness, burst, tear, and weight	9	12½
12—Same as 11 with 2 extra sheets	10½	15½
13—Make one sheet of 80 pounds (1000 square feet) double lined, 5 ply, board with proportioned liners and fillers, press, place in drier	15 minutes	
14—Same as 13 including drying time	33 minutes	
15—Make 2 sheets same as 13 and place in drier	24 minutes	
16—Same as 15 including drying time	42 minutes	

Similarity to Paper Machine

Among the initial requirements of this apparatus was the desirability of similar properties between test sheets and machine made paper. This feature is believed to exist to a considerable degree but further experimentation will be required before positive statements can be made. Paper machines have so many variables that comparison of test sheets to paper made by different machines from the same or similar headbox stock will show considerable divergence. However, it is a point in favor of a sheet making process if the characteristics of sheets made from headbox stock are of the same order of magnitude as those of machine made paper.

Only preliminary tests have been made by taking the sample from the headbox and making sheets of the same weight as the commercial sheet. In most cases the sheets were calendered (in the press) to produce, as nearly as possible, the same finish as the commercial sheet. The following remarks can be made regarding the various properties.

Mullen:—Approximately the same. Generally a trifle higher on sheets over 50 pounds, and a trifle lower on light weight sheets.
Tear:—About the same.
Fold:—Not investigated.
Ash:—Approximately the same on 45 pound sheets. A trifle higher on lighter sheets and a trifle lower on heavy sheets. This applies to heavily loaded sheets with ash ranging from 10 to 23 per cent.
Size:—Appears to be the same on sheets with small amounts of loading or no loading. The presence of large amounts of loading appears to greatly reduce the sizing in the test sheets. The reason for this is not understood as yet but further investigation is expected to correct the situation.
Bulk:—Test sheets are inclined to have more bulk if not calendered. They can be calendered as much as desired and the bulk brought down to that of the commercial machine, or much less.
Porosity:—Uncalendered test sheets are more porous. Calendering decreases the porosity to a point considerably below that of the commercial paper.
Finish:—Uncalendered sheets have a very poor finish. Calendering brings up the finish about equal to that of moderately machine finished papers. It will not equal high machine finished papers. Calendering in the sheet machine press has been studied very little. The method suggested can doubtless be greatly improved upon.

This Process Versus Use Requirements

In an early section of this report, the method and apparatus requirements for various possible uses of test sheets were outlined. It is now necessary to check the process, as developed, against those use requirements.

Evaluation of Pulps

It is believed that this apparatus, and the method of use recommended, fully meets the requirements. Pulp testing involves some kind of testing beater or other treatment apparatus. Variations of results arising in the sheet making and testing apparatus are considerably less than variations arising in the taking of the sample from the beater, or in selecting the original pulp sample from a carload lot.

If the consistency in the pulp testing beater is uniform, as it should be, only 9 minutes is required to get the slowness, burst, and tear on each sample. This means that the operator will have complete results and the curves plotted within fifteen minutes after the beater cycle is completed.

Control of Process

The ideal sheet machine could be operated by anyone. Obviously, this method and apparatus can not be used by just anyone, to produce reliable results. Technical knowledge and education are not required in the least. It is necessary, however, that the operator be interested in the job and able to follow instructions. A "sloppy" or careless workman would not do. The type of man who would make a good machine hand, mechanic, millwright, or any kind of craftsman, or sub-foreman would get reproducible results.

For control work, it is recommended that standard weight sheets always be made, and slowness, burst, tear, and weight be recorded on the record sheet. Since these results can be obtained in eleven minutes, it is believed that the apparatus will be useful for many control purposes. Just how useful it will be depends upon the type of paper made, the materials used, and the mechanical or chemical processes involved. Each mill has its own problems.

The points where pulp is sampled for control work, and the manner in which samples are taken, are very important. There is no point in running a test on a sample if it is not representative of the batch or flow from which it was taken.

When used as a tool for control, a sheet machine must be in the department where the processing is done and un-

der the full and direct supervision of the head of that department. With cooperation of the laboratory, the calibration of the felts can be regularly done. It is highly desirable that the demand for test sheet control originates, in every case, with the foreman of the department. If this pointer is observed, many fruitless installations will be avoided.

RECORD OF PROCESS

Practically the same remarks apply here as were made regarding control. The record sheet from the sheet machine should be saved and filed under the order number, date, and time which designate the sample.

Record of process may be very desirable in some mills and pointless in others. If adopted as a desirable procedure, it should be under the supervision of the mill superintendent, and carried out in a routine manner by operators of his selection. This is because it is the superintendent who can make profitable use of the record in reproducing orders.

SELECTION OF FURNISH

This type of work will usually be carried out in a laboratory under the supervision of the mill chemist, or other technical man. The problems will vary with different mills and will be influenced largely by the type of paper made and the materials available. It is believed that the method and apparatus for sheet making, outlined in this report, are admirably adapted to this work.

When experiments of this type are conducted, rapid results are very important since the experimenter generally decides the nature of the next test from examination of the last one. If a long wait between tests is necessary, for conditioning and testing of sheets, the amount and value of the work that can be accomplished is greatly reduced. An investigator loses interest and energy unless the answer to the problem being studied can be arrived at by continuous and undelayed experiments. Delays and waiting periods mean destraction of concentration on the problem, as well as a strain on the investigator's patience and that of his employer.

Studies of machine furnishes involve treatment equipment of a laboratory size. It is advisable that the equipment used give the same type of mechanical treatment to the fiber as the average given by the commercial units in the mill. For this reason the equipment should be adjustable in some way to vary the type of treatment. It could then be correlated roughly with the mill equipment and thereafter used as a "mill standard."

Furnish studies begin with a rough corelation to the paper machine by examination of samples from stock in process, and headbox, with reference to the finished paper. When rough or general relationships have been established, the same furnishes should be worked up in the experimental beater and a basis of comparison established between that process and the commercial units. With this as a foundation, variations in furnish may be made, one after another, in the experimental beater. There is reason to believe that the trends noticed in the sheet properties, due to variations in the furnish, will also be realized upon when the same changes are made on production runs.

Analysis of Mechanical and Chemical Processes

This subject merits the study of most paper mills. The apparatus, herein described, is believed to cover the requirements fully.

Of all the beaters and jordans in service today, it is likely that not more than 50 per cent of them are operating at anywhere near the optimum conditions for production of the type of fiber treatment that is desirable for the sheet being made. The operators use the equipment to the best of their knowledge and experience. Sometimes they well know that it is not the right type of equipment to use for the job. They can not experiment to any great extent on production runs and, even if they could, the variables in the paper machine cast doubt upon the results of the tests.

By making test sheets on end-of-the-week short runs, and at various other opportunities, different methods of handling equipment, different consistencies, different working tackle, etc., can be definitely shown up to be advantageous or disadvantageous to the sheet properties that are most desired. Such tests point the way to desirable equipment changes. Many mills have already carried on this type of work with much less reliable and rapid equipment.

Conclusion

The general conclusion of the manufacturer of this apparatus is that it meets, or closely approaches, the requirements as originally established. The method of use, as developed and recommended, will likely be improved upon by those more experienced in the subject. It is the desire of the manufacturer to cooperate in every possible way with those who recognize the general need of pulp and paper mills for some rapid, reliable, and standard method of evaluating pulps and stock in process.

Investigations by competent, disinterested, parties of the statements contained in this report, with a view to perfection and standardization of a sheet making method and apparatus, will be sincerely welcomed.

Manning Paper Co. 90 Years Old

TROY, N. Y., February 24, 1936—The history of the Manning Paper Company, which has just observed its 90th birthday, dates back to 1846. Since then the business has been conducted by various corporations which eventually merged into the present concern. The plant in this city was built 90 years ago by William H. Manning and Gardner Howland when manila paper was manufactured. In 1850 Reuben Peckham acquired an interest and the firm assumed the name of Manning, Peckham & Howland. After the death of Mr. Manning in 1855 the firm was continued under the name until 1862, when John A. Manning, a son, became a co-partner. Besides the plant here the concern also operates a large factory at Green Island.

The total number of the two plants at this time is estimated at about 220 hands and when operating at full capacity the Green Island plant employs 310 workers. Paper turned out at the latter plant is made principally from rope fiber and the heavier products are used mainly for flour sacks and sand paper backings. At the Troy plant production is confined largely to a product known as rag boards which are used to a great extent in the construction of transformers.

The annual output of the Green Island factory is about 9,000 tons, while the Troy plant has about one-third that amount. At the present time about 40 per cent of capacity product is the schedule, and during the past four years the company has endeavored to maintain no less than a three-and-a-half-day week for workers.

Officials of the concern at the present time are John A. Manning, president; Frank E. Gallagher, vice-president; James A. Adams, vice-president and general manager; Albert S. Loring, vice-president and general manager; Eugene Warren, secretary and treasurer; Joseph Hayes, assistant treasurer. Roland Eustace is superintendent of the Green Island plant while William M. Peckham serves in a similar capacity at the Troy branch.

IMPORTS OF PAPER AND PAPER STOCK

NEW YORK, BOSTON, PHILADELPHIA AND OTHER PORTS

NEW YORK IMPORTS

WEEK ENDING FEBRUARY 22, 1936

CIGARETTE PAPER

Standard Products Corp., Pr. Roosevelt, Havre, 18 cs.; Champagne Paper Corp., Ile de France, Havre, 796 cs.; De Manduit Paper Corp., Manhattan, Havre, 175 cs.

WALL PAPER

Titan Shipping Co., Stavangerfjord, Hagastrom, 10 bxs.; F. J. Emmerich, Deutschland, Hamburg, 8 bls., 2 cs.; F. Blank, Manhattan, Havre, 6 cs.; ———, Majestic, Southampton, 1 cs.; F. J. Emmerich, Hamburg, Hamburg, 7 bls.; S. K. Lonegren, Drottningholm, Gothenburg, 3 bxs.

NEWS PRINT

———, Stavangerfjord, Oslo, 317 rolls; N. Y. Evening Journal, Markland, Liverpool, N. S., 285 rolls; N. Y. Tribune, Markland, Liverpool, N. S., 1,407 rolls; World Telegram, Markland, Liverpool, N. S., 630 rolls; Bridgeport, Herald, Markland, Liverpool, N. S., 48 rolls; Westchester Newspapers, Inc., Standard Star, Markland, Liverpool, N. S., 45 rolls; Clinton Paper Corp., Markland, Liverpool, N. S., 216 rolls; Perkins Goodwin & Co., Deutschland, Hamburg, 341 rolls; Walker Goulard Plehn Co., Deutschland, Hamburg, 70 bls.; Jay Madden Corp., Pr. Roosevelt, Hamburg, 197 rolls; Jay Madden Corp., Europa, Bremen, 258 rolls; Jay Madden Corp., Manhattan, Hamburg, 195 rolls; Gilman Paper Co., Malaren, Hallstavik, 458 rolls; Brooklyn Times, Malaren, Hallstavik, 383 rolls; Jay Madden Corp., Malaren, Kotka, 275 rolls; Walker Goulard Plehn Co., Hamburg, Hamburg, 42 bls.; Perkins Goodwin & Co., Hamburg, Hamburg, 473 rolls.

PRINTING PAPER

F. Post & Co., Ingria, Marseilles, 4 cs.; L. A. Consmiller, Hamburg, Bremen, 16 cs.; E. Dietzgen & Co., Hamburg, Bremen, 23 cs.

PACKING PAPER

Irving Trust Co., Deutschland, Hamburg, 10 cs.

WRAPPING PAPER

National Pulp & Paper Co. Inc., Drottningholm, Gothenburg, 846 rolls; Wilkinson Grey & Co., Drottningholm, Gothenburg, 41 rolls, 16 bls.; Blauvelt Wiley Paper Manfg. Co., Drottningholm, Gothenburg, 20 rolls; Walker Goulard Plehn Co., Drottningholm, Gothenburg, 60 bls.; Chase National Bank, Drottningholm, Gothenburg, 1,964 rolls; Guaranty Trust Co., Drottningholm, Gothenburg, 62 rolls; Jay Madden Corp., Manhattan, Hamburg, 1,060 rolls; ———, Exeter, Genoa, 7 bls.; F. C. Strype, Black Hawk, Antwerp, 5 cs.; ———, Hamburg, Bremen, 27 bls.

FILTER MASSE

A. Giese & Son, Hamburg, Hamburg, 30 bls.

FILTER COMPOUND

P. H. Petry & Co., Deutschland, Hamburg, 100 bls.; Globe Shipping Co., Hamburg, Hamburg, 100 bls.

FILTER PAPER

H. Reeve Angel & Co. Inc., Aurania, London, 22 cs.; C. Schleicher & Schull Co. Inc., Hamburg, Hamburg, 10 cs.; ———, Hamburg, Hamburg, 4 cs.

DRAWING PAPER

H. Reeve Angel & Co. Inc., Aurania, London, 3 cs.

COLORED PAPER

D. C. Andrews & Co., Europa, Bremen, 2 cs.; J. W. Hampton Jr. & Co., E. Francqui, Antwerp, 3 cs.

BARYTA COATED PAPER

Globe Shipping Co., Deutschland, Bremen, 9 crates.

METAL COATED PAPER

K. Pauli Co., Deutschland, Bremen, 18 cs.; K. Pauli Co., Hamburg, Bremen, 40 cs.; K. Pauli Co., Hamburg, Hamburg, 6 cs.

SURFACE COATED PAPER

Dingelstedt & Co., Ilsenstein, Antwerp, 20 cs.; Gevaert Co. of America, Westernland, Antwerp, 57 cs.; C. Happel, Manhattan, Hamburg, 19 cs.; C. Happel, Hamburg, Hamburg, 8 cs.

BASIC PAPER

Dingelstedt & Co., Deutschland, Bremen, 9 cs.; Dingelstedt & Co., Ilsenstein, Antwerp, 1 cs.; Dingelstedt & Co., Hamburg, Bremen, 20 cs.

PHOTO PAPER

American Express Co., Deutschland, Hamburg, 38 cs.; Medo Photo-Supply Co., Majestic, Southampton, 2 cs.; J. J. Gavin, Majestic, Southampton, 2 cs.

DECALCOMANIAS

Sellers Transportation Co., Europa, Bremen, 21 cs.; Sellers Transportation Co., Deutschland, Hamburg, 3 cs.; Phoenix Shipping Co., Deutschland, Hamburg, 8 cs.; Phoenix Shipping Co., Hamburg, Hamburg, 7 cs.; Sellers Transportation Co., Hamburg, Hamburg, 3 cs.

DECALCOMANIA PAPER

B. F. Drakenfeld & Co., Antonia, Liverpool, 35 cs.

TRANSFER PICTURES

D. C. Andrews & Co., Europa, Bremen, 1 cs.; Rohner Gehrig & Co., Europa, Bremen, 6 cs.

TISSUE PAPER

M. Snedeker Corp., American Trader, London, 1 cs.; F. C. Strype, Antonia, Liverpool, 6 cs.; W. J. Byrnes, Majestic, Southampton, 4 cs.; Van Oppen & Co., Exeter, Genoa, 23 cs.

CREPE PAPER

Phoenix Shipping Co., Deutschland, Hamburg, 5 cs.

MARBLE PAPER

Tamm & Co., E. Francqui, Antwerp, 1 cs.

CARD BOARD

———, Europa, Bremen, 56 bls.

WOOD PULP PASTE BOARD

———, Pr. Roosevelt, Hamburg, 115 cs.

PAPER TUBES

———, Deutschland, Bremen, 45 ctn., 34 cs.; ———, Hamburg, Hamburg, 47 ctn., 15 cs.

STRAW BOARD

———, Black Osprey, Rotterdam, 209 bdls.; ———, Beemsterdyk, Rotterdam, 24 rolls.

MISCELLANEOUS PAPER

Keuffel & Esser Co., Deutschland, Hamburg, 15 cs., 30 rolls; Irving Trust Co., Ile de France, Havre, 5 cs.; A. Giese & Son, Ile de France, Havre, 40 bls.; Coty Processing Co., Ile de France, Havre, 7 cs.; American Express Co., Ile de France, 2 bls.; Jay Madden Corp., Hamburg, Hamburg, 3 bls.; National Pulp & Paper Co. Inc., Drottningholm, Gothenburg, 321 bdls., 1,476 rolls; Lunham & Reeve, Inc., Drottningholm, Gothenburg, 62 rolls; Blauvelt Wiley Paper Manfg. Co., Drottningholm, Gothenburg, 9 rolls, 22 bls.; The Borregaard Co. Inc., Drottningholm, 754 bls., 4,551 rolls; F. L. Kramer & Co., Drottningham, 370 bls.; Japan Paper Co., Drottningholm, Gothenburg, 1 cs.; E. H. Sargent & Co., Drottningholm, Gothenburg, 9 cs.

RAGS, BAGGINGS, ETC.

Irving Trust Co., Deutschland, Hamburg, 74 bls. rags; New England Waste Co., Deutschland, Bremen, 99 bls. picker waste; ———, Pr. Roosevelt, Hamburg, 132 bls. rags; ———, Pr. Roosevelt, Havre, 381 bls. rags; Castle & Overton, Inc., Argentino, Beunos Ayres, 31 bls. bagging; Castle & Overton, Inc., Argentino, Beunos Ayres, 69 bls.; Commercial Bank of Greece, Exilona, Piraeus, 60 bls. rags; Commercial Bank of Greece, Exilona, Piraeus, 65 bls. dark cottons; G. M. Graves Co. Inc., Caledonia, Glasgow, 89 bls. bagging; Chase National Bank, Caledonia, Glasgow, 82 bls. bagging; Chase National Bank, Ilsenstein, Antwerp, 48 bls. rags; ———, Ilsenstein, Antwerp, 247 bls. bagging; S. Birkenstein & Sons, Motomar, Alicante, 103 bls. rags; G. W. Millar & Co. Inc., Motomar, Barcelona, 160 bls. rags; Castle & Overton, Inc., Collamer, Havre, 14 bls. rags; Castle & Overton, Inc., Collamer, Havre, 241 bls. bagging; Flintkote Corp., Collamer, Havre, 178 bls. rags; W. Steck & Co., Collamer, Havre, 39 bls. old strings; J. T. Flannery, Collamer, Havre, 34 bls. old strings; Irving Trust Co., Collamer, Havre, 41 bls. bagging; Irving Trust Co., Collamer, Havre, 9 bls. old carpets; Harris Goldman & Co., Collamer, Havre, 87 bls. rags; G. W. Millar & Co. Inc., Collamer, Dunkirk, 45 bls. tares; ———, Aurania, London, 5 bls. rags; J. J. Ryan & Sons, Bordeaux Maru, Shanghai, 450 bls. cotton waste; ———, Manhattan, Hamburg, 102 bls. rags; ———, Manhattan, Hamburg, 103 bls. bagging; G. W. Millar & Co. Inc., Quaker City, Dundee, 24 bls. paper stock; Castle & Overton, Inc., Quaker City, Dundee, 284 bls. paper stock; Continental Bank Trust Co., Quaker City, Dundee, 75 bls. paper stock; Irving Trust Co., Schodack, Havre, 44 bls. rags; ———, Schodack, Havre, 47 bls. cotton waste; Harris Goldman & Co., Schodack, Havre, 35 bls. linsey garments; Irving Trust Co., Schodack, Dunkirk, 51 bls. bagging; W. Steck & Co., Exeter, Alexandria, 71 bls. rags; R. Blank, Exeter, Alexandria, 66 bls. rags; J. T. Flannery, Exeter, Alexandria, 136 bls. rags; E. J. Keller Co. Inc., Exeter, ———, 170 bls. rags; E. J. Keller Co. Inc., Exeter, ———, 42 bls. bagging E. J. Keller Co. Inc., Exeter, ———, 28 bls. linsey garments; Chase National Bank, Ingria, Barcelona, 200 bls. rags; ———, Ingria, Barcelona, 31 bls. dark cottons; ———, Ingria, Barcelona, 8 bls. bagging; Continental Bank Trust Co., Ingria, Barcelona, 70 bls. bagging; Van Oppen & Co., Ingria, Barcelona, 64 bls. bagging; Bank of N. Y. Trust Co., Ingria, Barcelona, 171 bls. paper stock; D. Bennedetto, Black Hawk, Antwerp, 106 bls. rags; F. Stern, Black Hawk, Antwerp, 60 bls. rags; N. Schwab & Sons, Inc., Black Hawk, Antwerp, 121 bls. cotton waste; W. Steck & Co., Black Hawk, Antwerp, 79 bls. hemp waste; E. J. Keller Co. Inc., Black Hawk, ———, 282 bls. bagging; E. J. Keller Co. Inc., Examiner, ———, 94 bls. rags; ———, Examiner, Barcelona, 328 bls. cotton waste; S. Birkenstein & Sons, Examiner, Barcelona, 66 bls. bagging; Bank of N. Y. Trust Co., Examiner, Barcelona, 69 bls. dark cottons; ———, Examiner, Barcelona, 173 bls. bagging; ———, Examiner, Barcelona, 144 bls. dark cottons; Katzenstein & Keene, Inc., Examiner, Barcelona, 426 bls. dark cottons; Katzenstein & Keene, Inc., Examiner, Barcelona, 170 bls. bagging; ———, Hamburg, Hamburg, 23 bls. rags; Van Oppen & Co., Black Osprey, Rotterdam, 170 bls. bagging; E. J. Keller Co. Inc., Black Osprey, ———, 661 bls. rags; Loumar Textile By-Products Co., Beemsterdyk, Rotterdam, 153 bls. bagging; E. J. Keller Co. Inc., Beemsterdyk, ———, 122 bls. bagging; ———, Beemsterdyk, ———, 185 bls. rags.

GLUE STOCK, ETC.

National Adhesives Co., Deutschland, Hamburg, 120 bags ground glue; Darmstadt Scott & Courtney, Motomar, Barcelona, 56 bls., 282 bags blue stock; Banco Com'l. Italiane Trust Co., Motomar, Barcelona, 700 bags glue stock; ———, Westernland, Antwerp, 209 bls. hide cuttings; ———, Ida, Trieste, 80 bags hide glue; ———, Hamburg, Hamburg, 100 bags bone glue.

OLD ROPE

W. Steck & Co., M. de Commillas, Vigo, 184 coils; W. Steck & Co., Black Osprey, Rotterdam, 36 coils; ———, Caledonia, Glasgow, 42 coils.

CHINA CLAY

English China Clays Sales Co., Antonia, Liverpool, 252 bags.

CASEIN

———, Collamer, Havre, 150 bags, 15,000 kilos.

WOOD PULP

———, Stavangerfjord, Sarpsborg, 510 bls. sulphite; The Borregaard Co. Inc., Stavangerfjord, Sarpsborg, 908 bls. sulphate; ———, Pr. Roosevert, Hamburg, 2,514 bls. wood pulp; J. Andersen & Co., Exilona, Constanza, 790 bls. wood pulp, 158 tons; ———, Exilona, Constanza, 1,000 bls. wood pulp, 200 tons; M. Sone, Manhattan, Hamburg, 1,132 bls. wood pulp, 177 tons; Lagerloef Trading Co., Malaren, Kotka, 420 bls. sulphate; Lagerloef Trading Co., Malaren, Kotka, 2,074 bls. sulphite; G. H. MacFadden & Bro., Hamburg, Hamburg, 700 bls. wood pulp, 140 tons; Castle & Overton, Inc., Hamburg, Hamburg, 250 bls. wood pulp, 50 tons; Chemical Bank Trust Co., Hamburg, Hamburg, 1,650 bls. wood pulp, 254 tons; Perkins Goodwin & Co., Drottningholm, Gothenburg, 2,794 bls. kraft pulp; Perkins Goodwin & Co., Drottningholm, Gothenburg, 125 bls. sulphite; D. M. Hicks, Inc., Drottningholm, Gothenburg, 210 bls. sulphite.

WOOD PULP BOARDS

———, Malaren, Kotka, 278 rolls; Griffin Rutgers, Inc., Hamburg, Hamburg, 60 cs.; G. H. MacFadden & Bro., Hamburg, Hamburg, 124 bls.; H. Fuchs & Son, Hamburg, Hamburg, 75 crates.

BOSTON IMPORTS

WEEK ENDING FEBRUARY 22, 1936

Ayres, W. C. Jones Co., Schodack, Havre, 58 bls. cotton waste; Irving Trust Co., Schodack, Havre, 58 bls. bagging; Irving Trust Co., Schodack, Dunkirk, 41 bls. bagging; Royal Manfg. Co., Schodack, Dunkirk, 58 bls. cotton waste.

New York Market Review

Office of the PAPER TRADE JOURNAL.
Wednesday, February 26, 1936.

Considering the unfavorable weather and other distractions during the past few weeks the local paper market is holding up well. Demand for the various standard grades is fairly persistent and should become livelier with the approach of Spring. Prices are generally holding to previously quoted levels.

The newsprint paper market is displaying more strength. Circulations of the leading newspapers are rising and the volume of advertising is gradually increasing. Manufacturing operations in the United States, Canada and Newfoundland are proceeding with regularity, while stocks at the mills are not excessive.

Demand for the various grades of fine paper is well sustained, including book, bond, cover and ledger papers. Prices continue steady. Tissues are moving into consumption in good volume for the time of year. The coarse paper market is sharing the general business improvement. Business in the paper board market is improving.

Mechanical Pulp

The ground wood pulp market is exhibiting a stronger undertone. Production in North America and abroad is being maintained in sufficient volume to take care of current requirements. There are no undue accumulations at the pulp mills and the statistical position of the industry is sound. Prices are holding to schedule.

Chemical Pulp

Steadiness prevails in the chemical pulp market. Demand for the various domestic and imported grades is well up to average for the time of year. Offerings of kraft pulp are scarce and quotations firm. Orders are being booked freely for 1937 delivery. Domestic and foreign bleached sulphite continue firm.

Old Rope and Bagging

The old rope market is showing signs of improvement. Demand for imported and domestic old manila rope is more active and prices are steadier. Mixed strings are fairly active. The bagging market is stronger. Both scrap and gunny bagging are in good request. Prices on roofing bagging have advanced slightly.

Rags

Business in the domestic rag market is brisker. Paper mill interest in new and old cotton rags is more in evidence than of late, especially for such grades as No. 1 white shirt cuttings, fancy shirt cuttings, etc. Roofing rags are particularly strong, with quotations higher, right along the line. The imported rag market is stronger.

Waste Paper

The paper stock market is quite buoyant and both the lower and higher grades of waste paper are firmer. In the better grades, advances have been recorded on white envelope cuttings, and hard and soft white shavings. New manila envelope cuttings are also higher. Perhaps the most encouraging advance to the paper mill supplies dealer is that of No. 1 mixed paper, which is now selling at 27½ to 32½.

Twine

Conditions in the local twine market are favorable. While demand for the various varieties is rather restricted at present, due to the inclement weather and other causes, trading should expand materially now that Eastertide is near at hand. The price situation is considered satisfactory and recently announced increases are well maintained.

Mexican Government Agency Buys Paper

[FROM OUR REGULAR CORRESPONDENT]

WASHINGTON, D. C., February 24, 1936—The New semi-governmental paper importing company, with headquarters in Mexico City, has commenced to function, according to a recent report from Commercial Attache Thomas H. Lockett, Mexico City. So far, purchases have been restricted to newsprint, which the company will resell to newspaper publishers in Mexico City at approximately 207.50 pesos per ton. Newsprint of domestic manufacture is being sold at 230 pesos per ton.

While the company has heretofore confined its purchases almost entirely to newsprint, it will turn its attention to other classes of paper from now on. During the first few months of the current year the company will buy approximately 1000 tons of various grades of sized and supercalendered book papers. In addition, it will purchase considerable quantities of bond writing paper, envelopes, and the cheaper grades of book paper. The technical experts of the company are convinced that the United States produces the best grades of bond and super-calendered papers, and it is very likely that part of the order, at least, for these papers will go to United States manufacturers. On the other hand, the cheaper grades of book papers can be bought from European manufacturers at a price 15 to 20 per cent less than those quoted by American producers.

Heads Interstate Paper & Cordage Co.

Following the death on December 21, 1935, of Charles F. Hubbs, a nationally known figure in the wrapping paper industry, Finley T. Jamison was elected to succeed him as president of the Interstate Cordage and Paper Company, of 14 Fourth avenue, Pittsburgh, Pa. F. T. Jamison is well known in the wrapping paper and allied industries.

The other officers elected, were as follows: first vice-president A. J. Corning; second vice-president William H. Howe; secretary H. W. Doremus, and treasurer R. C. Kettles, Jr.

All of these gentlemen have been long associated with Mr. Hubbs, and are especially qualified by ability and experience to carry on his ideas and principles.

Miscellaneous Markets

Office of the PAPER TRADE JOURNAL,
Wednesday, February 26, 1936.

BLANC FIXE.—The position of the blanc fixe market is fairly satisfactory. Prices are generally holding to schedule. The pulp is quoted at $42.50 to $45 per ton, in bulk; while the powder is selling at 3½ to 3¾ cents per pound, in barrels, at works.

BLEACHING POWDER.—Conditions in the bleaching powder market are practically unchanged. The contract movement is normal for the season. Prices are generally well sustained. Bleaching powder is quoted at $2 to $2.25 per 100 pounds, in drums, at works.

CASEIN.—The casein market is easier. Domestic standard ground is now quoted at 14½ and finely ground at 15 cents; Argentine and French standard ground at 14 and finely ground at 14¼ cents per pound, all in bags, car lot quantities.

CAUSTIC SODA.—Steadiness prevails in the caustic soda market. Prices are holding to formerly quoted levels, without difficulty. Solid caustic soda is selling at $2.55 to $2.60; while the flake and ground are offered at $2.95 to $3 per 100 pounds, in drums, at works.

CHINA CLAY.—The china clay market is displaying strength. Contract shipments are moving regularly. Prices are firm. Imported china clay is quoted at $13.50 to $21 per ton, ship side, while domestic paper making clay is selling at $6.50 to $12 per ton, at mine.

CHLORINE.—Paper mill demand for chlorine is fairly active. The contract movement is well up to average. Prices are generally holding to formerly quoted levels. Chlorine is quoted at $2.15 to $2.55 per 100 pounds, in tanks, or multi-unit cars, at works.

ROSIN.—The rosin market is stronger. Paper making gum rosin is now quoted at $4.55 and wood rosin at $4.25 per 280 pounds, gross weight, in barrels, at Savannah. Seventy per cent rosin size is selling at $2.61½ per 100 pounds, in tank cars, at works.

SALT CAKE.—Demand from the paper mills for salt cake continues persistent. The contract movement is fairly heavy. Salt cake is quoted at $12 to $13; chrome salt cake at $11 to $12 per ton, at works. Imported salt cake is selling at $12 to $13 per ton, ship side.

SODA ASH.—The soda ash market is exhibiting a fairly strong undertone. The movement of supplies into consumption is normal for the season. Quotations on soda ash, in car lots, at works, per 100 pounds, are as follows: in bulk, $1.05; in bags, $1.20, and in barrels, $1.50.

STARCH.—Business in the starch market is improving. Demand from the paper mills is more active. Prices are slightly higher. Special paper making starch is now quoted at $3.10 per 100 pounds, in bags; at $3.37 per 100 pounds, in barrels, at works.

SULPHATE OF ALUMINA.—No radical changes transpired in the sulphate of alumina market. Prices are holding to schedule, without difficulty. Commercial grades are quoted at $1.35 to $1.50 and iron free at $1.90 to $2.05 per 100 pounds, in barrels, at works.

SULPHUR.—The sulphur market is steady. On yearly contracts, sulphur is quoted at $18 per long ton, in bulk, on orders of 1,000 tons or over, and at $20 per ton on any smaller quantity. On spot and nearby carloads, the quotation is $21 per ton. All prices in car lots, at mine.

TALC.—Most of the business transacted in the talc market during the past week was along routine lines. Prices remain unchanged. Domestic talc is quoted at $16 to $18 per ton, at eastern mines; while imported talc is selling at $23 to $30 per ton, on dock.

Market Quotations

Paper

Rag Content Bond & Ledgers— Delivered Zone 1	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers— Delivered Zone 1	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

Book, Cased—		
S. & S. C.	5.35 @	5.75
S. & S. C. Litho.	5.60 @	6.00
M. F.	5.10 @	5.50
Coated and Enamel	5.90 @	6.55
Coated Litho	5.90 @	6.55

Tissues—Per Ream—		
White No. 1	.82½ @	—
White No. 1 M. G.	.77½ @	—
White No. 1½	.62½ @	—
White No. 2	.60 @	—
Anti-Tarnish M. G.	.67½ @	—
Colored	.80 @	—
Kraft	.67½ @	—
Manila	.60 @	—
Unbleached Toilet.	2.60 @	3.30
Bleached Toilet	3.94 @	5.26

Paper Towels—		
Unbleached	2.10 @	3.35
Bleached	3.30 @	3.70

Manila—		
No. 1 Jute	9.00 @	9.25
No. 2 Jute	7.75 @	8.50
No. 1 Wood	4.00 @	5.25
No. 2 Wood	3.50 @	4.00

Fibre Papers—		
No. 1 Fibre	4.25 @	5.50
No. 2 Fibre	4.00 @	4.75

(Delivered New York)

News, per ton—		
Roll, contract	41.00 @	—
Sheets	46.00 @	—

Kraft—		
No. 1 Northern	4.12½ @	4.75
Standard	4.00 @	—
Southern	3.87½ @	—

Boards—per ton—		
News	37.50 @	—
Chip	37.50 @	—
Sgl. Mla. Ll. Chip.	42.50 @	45.00
Jute Lined Chip	42.50 @	45.00
Kraft Liners	57.50 @	60.00
White Patent Coated	55.00 @	57.50
Binders Boards	67.00 @	75.00

Mechanical Pulp

(On Dock, Atlantic Ports)

No. 1 Imported—		
Moist	22.00 @	23.00
Dry	22.00 @	23.00

(F. o. b. Mill)

No. 1 Domestic and Canadian	18.00 @	24.00

Chemical Pulp

(On Dock, Atlantic, Gulf and West Coast Ports)

Bleached Sulphite (Domestic and Foreign)—		
Division 1	2.60 @	2.90
Division 2	2.55 @	—*
Division 3	2.50 @	—*

Prime Qualities—		
Class 1. All Prime Easy Bleaching	2.05 @	—*

Other Than Easy Bleaching—		
Class 2. Higher than Standard	2.00 @	—*
Class 3, Standard	1.95 @	—*
Class 4, Lower than Standard	1.90 @	—*

(On Dock, Atlantic Ports)

Kraft No. 1	1.80 @	1.95
Kraft No. 2	1.65 @	1.75

(F. o. b. Pulp Mill)

Kraft Domestic	1.75 @	1.80

(Delivered)

Soda Bleached	2.50 @	—

* Add 60 Cents per short ton, dock charges, for Albany; $2.00 for Lake Ports East and $3.00 for Lake Ports West of Mackinac Straits.

Domestic Rags

New Rags

(Prices to Mill f. o. b. N. Y.)

Shirt Cuttings—		
New White, No. 1	8.00 @	8.15
Silesias No. 1	5.50 @	5.75
New Unbleached	8.25 @	8.50
New Soft Blacks	3.75 @	4.00
Blue Overall	5.75 @	6.00
Fancy	3.00 @	3.25
Washables	2.00 @	2.25
Mixed Khaki Cuttings	3.25 @	3.50
O. D. Khaki Cuttings	4.00 @	4.25
Men's Corduroy	2.00 @	2.25
New Mixed Blacks	2.75 @	3.00

Old Rags

White, No. 1—		
Repacked	3.00 @	3.50
Miscellaneous	2.75 @	3.25

White, No. 2—		
Repacked	1.75 @	2.25
Miscellaneous	1.50 @	1.75

Thirds and Blues—		
Repacked	1.75 @	1.85
Miscellaneous	1.45 @	1.55

Roofing Rags—		
No. 1	1.80 @	1.90
No. 2	1.70 @	1.75
No. 3 (bagging)	1.40 @	1.50
No. 4	1.05 @	1.10
No. 5A	1.00 @	1.05

Foreign Rags

New Rags

New Dark Cuttings	2.00 @	2.25
New Mixed Cuttings	1.80 @	1.90
New Light Silesias	3.75 @	4.00
Light Flannelettes	4.25 @	4.50
New White Cuttings	6.50 @	7.00
New Light Oxfords	3.25 @	3.50
New Light Prints	2.75 @	3.00

Old Rags

No. 1 White Linens	7.50 @	8.00
No. 2 White Linens	6.50 @	7.00
No. 3 White Linens	4.50 @	5.00
No. 4 White Linens	2.25 @	2.50
No. 1 White Cotton	4.25 @	4.75
No. 2 White Cotton	3.25 @	3.75
No. 3 White Cotton	2.50 @	2.75
No. 4 White Cotton	1.90 @	2.15
Extra Light Prints	2.00 @	2.25
Ord. Light Prints	1.75 @	1.85
Med. Light Prints	1.55 @	1.65
Dutch Blue Cottons	2.00 @	2.25
French Blue Linens	2.30 @	2.40
German Blue Linens	2.15 @	2.25
German Blue Cottons	1.70 @	1.80
Checks and Blues	1.70 @	1.80
Linsey Garments	1.95 @	2.05
Dark Cottons	1.80 @	1.90
Old Shopperies	1.00 @	1.05
New Shopperies	1.25 @	1.35
French Blues	2.00 @	2.25

Old Rope and Bagging

(Prices to Mill f. o. b. N. Y.)

Gunny No. 1—		
Foreign	2.20 @	2.25
Domestic	2.25 @	2.35
Wool Tares, light	1.75 @	2.00
Wool Tares, heavy	2.25 @	2.35
Bright Bagging	1.75 @	1.80

Manila Rope—		
Foreign	2.35 @	2.40
Domestic	2.25 @	2.30
Mixed Strings	.85 @	1.00
New Burlap Cut	2.00 @	2.25

Hessian Jute Threads—		
Foreign	2.60 @	2.75
Domestic	2.80 @	3.00

Old Waste Papers

(F. o. b. New York)

Shavings—		
White Envelope Cuttings	2.65 @	2.75
Ordinary Hard White No. 1	2.25 @	2.35
Hard White No. 2	2.10 @	2.20
Soft White No. 1	2.05 @	2.15

Flat Stock—		
Stitchless	.65 @	.75
Over issue Mag	.65 @	.75
Solid Flat Book	.55 @	.60
Crumpled No. 1	.35 @	.40
Solid Book Ledger	1.50 @	1.65
Ledger Stock	.85 @	.90
New B. B. Chips	.30 @	.35

Manilas—		
New Env. Cut	1.75 @	1.85
New Cuttings	1.35 @	1.45
Bogus Wrapper	.40 @	.50

Old Kraft Machine—		
Compressed bales	1.20 @	1.30

News—		
No. 1 White News	1.45 @	1.50
Strictly Overissue	.50 @	.55
Strictly Folded	.35 @	.37½
No. 1 Mixed Paper	.27½ @	.32½

FILTERS - -
Will Yours Do The Job?

WATER filters that are in need of repairs cannot do an efficient job for you. Call upon our engineering department for repairs, alterations or replacements to put your filtration equipment in top condition.

Norwood Engineering Co. **Florence, Mass.**

CLINTON STARCHES
Special Grades for Beater and Top Sizing

Manufactured by
CLINTON COMPANY
CLINTON, IOWA

QUALITY **SERVICE**

GEORGE F. HARDY
Consulting Engineer

305-309 Broadway, New York City, N. Y.

Member—Am. Soc. C.E.—Am. Soc. M.E.—Eng. Inst. Can.

Consultation	Paper and Pulp Mills
Reports	Hydro-Electric and
Valuations	Steam Power Plants
Estimates	Plans and Specifications

HARDY S. FERGUSON & CO.
Consulting Engineers
200 FIFTH AVENUE, NEW YORK CITY

Hardy S. Ferguson .....Member A.S.C.E., A.S.M.E., E.I.C.
Moses H. Teaze .....Member A.S.M.E., E.I.C., A.S.C.E.
J. Wallace Tower .....Member A.S.C.E., A.S.M.E.

Consultation, reports, valuations, and complete designs and engineering supervision for the construction and equipment of

Pulp and Paper Mills and other Industrial Plants.
Steam and Hydro-electric Power Plants.
Dams and other Hydraulic Structures.

HERMAN G. WEBER
Builder of High Speed Bag Machines

Grocery, Duplex, Coffee, Flour, Cellophane Satchel Bottom, Tuber & Bottomers Automatic Compensating Device.

SHEBOYGAN FALLS **WISCONSIN**

PERFORMANCE of your Centrifugals, Shakers and Drainers definitely improved by the use of precision screens built to your specifications. Let us "sit in" on your screening problems.

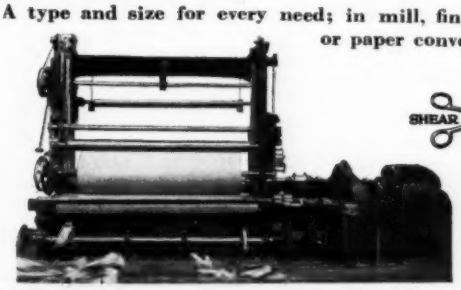
The Harrington & King PERFORATING CO.
5652 FILLMORE ST., CHICAGO—114 LIBERTY ST., NEW YORK

LINDSAY WIRES
Longcrimp, Spiral Weave
Modified Longcrimp
Duo-Wear and Regular Weave

They are all "Live Wires"

THE LINDSAY WIRE WEAVING COMPANY
14025 Aspinwall Ave., Cleveland, Ohio

LANGSTON *Slitters and Roll Winders*
A type and size for every need; in mill, finishing room or paper converting plant.



Twines

(F. o. b. Mill)

(Soft Fibre)

Coarse Polished—

India	.13¼	@	.15¼
Belg. White Hemp	.14½	@	.17¼
India Compress	.13¾	@	.14½

Fine Polished—

Fine India	.21½	@	.23½
Special	.19½	@	.21½

Unpolished—

Box	.12	@	.12½
Paper Makers	.09	@	.13½
Tube Rope	.10	@	.15½
Wall Paper	.11	@	.14½
Wrapping	.15½	@	.21
Special	.15	@	.15½
Soft Fiber Rope	.12½	@	.12¾

(Hard Fibre)

Bond	.12	@	.20½
Anchor	.11½	@	.13
Manila	.21	@	.2[illegible]

CHICAGO

Paper

(F. o. b. Mill)

Rag Bond	.12	@	.40
Water Marked Sulphite Bond	.06¾	@	.11
Sulphite Bond	.05½	@	.07¼
Superfine Writing	.18	@	.24
No. 1 M. F. Book	.06½	@	.07¼
No. 2 M. F. Book	.05¼	@	.06¼
No. 1 S.&S.C. Book	.06¾	@	.07¾
No. 2 S.&S.C. Book	.05¾	@	.06½
Coated Book	.07	@	.12
Coated Label	.07	@	.08½
No. 1 Manila	.04¼	@	.05¾
No. 1 Fibre	.04¾	@	.05¼
No. 2 Manila	.04¼	@	.04¾
Butcher's Manila	.03¼	@	.03¾
No. 1 Kraft	4.75	@	5.00
Southern Kraft	3.88	@	4.25
No. 2 Kraft	3.88	@	4.25
Wood Tag Boards	.04¾	@	.06¼
Sulphite Screenings	.03	@	.03¾
Manila Tissue	.05¾	@	.07
White Tissue	.07	@	.09

(Delivered Central Territory)

News, per ton—

Rolls, contract	42.00	@	—
Sheets, open	47.00	@	—

Boards, per ton—

Plain Chip	46.50	@	—
Solid News	50.00	@	—
Manila Lined Chip	55.00	@	—
Patent Coated	65.00	@	—

Container Lined—

85 Test, per 1000 sq. ft.			1.70
100 Test, per 1000 sq. ft.			1.85

Old Papers

(F. o. b. Chicago)

Shavings—

No. 1 White Envelope Cuttings	1.70	@	2.00
No. 1 Hard White	1.40	@	1.65
No. 1 Soft White	1.25	@	1.50
Ledger & Writings	.70	@	.80
Solid Books	.60	@	.70
Blanks	1.00	@	1.05
Krafts	.80	@	.90
New Kraft Cuts	1.20	@	1.30
Manila Env. Cuts	1.25	@	1.30
Ex. No. 1 Manila	.90	@	1.00
Print Manila	.40	@	.50
Overissue News	.40	@	.45

Old Newspapers—

No. 1	.30	@	.35
No. 1 Mixed Paper	.25	@	.30

Roofing Stocks—

No. 1	30.00	@	—
No. 2	28.00	@	—

PHILADELPHIA

Paper

Rag Content Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, M. F.	5.00	@	—
Book, S. S. & C.	5.25	@	—
Book, Coated	6.15	@	—
Coated Lithograph	6.15	@	—
No. 1 Jute Manila	10.50	@	—
Manila Sul., No. 1	6.75	@	—
Manila No. 2	4.25	@	—
No. 1 Kraft	6.00	@	—
Southern Kraft	5.00	@	—
News Print Rolls	40.00	@	—
Straw Board	40.00	@	45.00
News Board	40.00	@	—
Chip Board	37.50	@	—
Wood Pulp Board	70.00	@	85.00

Binder Boards—

No. 1, per ton	75.00	@	80.00
No. 2, per ton	70.00	@	75.00
Carload lots	65.00	@	70.00

Tarred Felts—

Regular	52.25	@	54.25
Slaters (per roll)	.84	@	.94

Domestic Rags (New)

(Price to Mill, f. o. b. Phila.)

Shirt Cuttings—			
New White, No. 1.	.07	@	.07½
New White, No. 2.	.05	@	.05½
Light Silesias	.04½	@	.05½
Silesias, No. 1	.04	@	.04½
Black Silesias, soft	.03	@	—
New Unbleached	.06½	@	—
Washable, No. 1	.02	@	.02½
Blue Overall	.05	@	.05½
Cottons—According to grades—			
Washable, No. 2	.02½	@	.04½
New Blue	.02	@	.02½
Fancy	.02	@	.02½
New Black Soft	.04¼	@	.04¾
New Light Seconds	.04	@	.04¼
New Dark Seconds	1.50	@	—
Khaki Cuttings—			
No. 1 O. D.	.04	@	.04½
No. 2 Mixed	.03½	@	.04½
Corduroy	.02	@	.02½
New Canvas	.04	@	.04½
New Black Mixed.	.02½	@	.02½

Domestic Rags (Old)

White No. 1—			
Repacked	4.00	@	4.50
Miscellaneous	3.00	@	3.50
Thirds and Blues—			
Miscellaneous	1.75	@	2.00
Repacked	2.50	@	2.75
Black Stockings (Export)	4.50	@	5.00
Roofing Stock—			
Foreign No. 1	2.00	@	2.10

Bagging

(F. o. b. Phila.)

Gunny, No. 1—			
Foreign	2.00	@	—
Domestic	2.25	@	—
Manila Rope	2.75	@	3.00
Sisal Rope	1.75	@	2.00
Mixed Rope	1.00	@	1.10
Scrap Burlaps—			
No. 1	2.00	@	2.50
No. 2	.90	@	1.00
Wool Tares, heavy	3.00	@	3.25
Mixed Strings	1.00	@	1.10
No. 1 New Light Burlap	3.00	@	3.50
New Burlap Cuttings	2.50	@	2.75

Old Papers

(F. o. b. Phila.)

Shavings—			
No. 1 Hard White	2.30	@	2.40
No. 2 Hard White	2.10	@	2.20
No. 1 Soft White	1.80	@	1.85
No. 2 Soft White	1.40	@	1.45
No. 1 Mixed	—	@	.85
Solid Ledger Stock	1.50	@	1.60
Ledger Stock, white	1.15	@	1.20
Ledger Stock, colored	.85	@	.90
No. 1 Books, heavy	.65	@	.70
Manila Cuttings	1.50	@	1.60
Print Manila	.50	@	.60
Container Manila	.50	@	.60
Kraft Paper	1.10	@	1.20
No. 1 Mixed Paper	.35	@	.40
Straw Board Chip	.40	@	—
Binders Board Chip	.40	@	—
Corrugated Board	.60	@	.65
Overissue News	.60	@	—
Old Newspapers	.40	@	—

BOSTON

Paper

Rag Content Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
100% Rag Ext. No. 1	.36	.37
100% Rag	.28	.29
75% Rag	.21	.22
65% Rag	.18	.19
50% Rag	.15	.16
25% Rag	.12½	.13½

Sulphite Bond & Ledgers—
Delivered Zone 1

	Bonds	Ledgers
No. 1 Sulphite	7.75	8.75
No. 2 Sulphite	6.75	7.75
No. 3 Sulphite	6.00	7.00
No. 4 Sulphite	5.50	6.50

F.o.b. Mill

Book, Super	.06	@	.09
Book, M. F.	.05½	@	.08½
Book, Coated	.08½	@	.18
Coated Litho	.09	@	.12
Jute Manila No. 1	.11	@	.13
Manila, Sul. No. 1	.04¼	@	.06½
Manila, Sul. No. 2	.03¾	@	.04½
No. 1 Kraft	.04¾	@	.05
No. 2 Kraft	.04¼	@	.04¾

(F. o. b. Boston)

Southern Kraft	.03¾	@	.04¼

(F. o. b. destination in carload lots, f. o. b. mill in less than carload lots)
(Delivered New England points)

News Print Rolls	39.50	@	—
Straw Board, rolls	30.00	@	35.00
Filled News Board	40.00	@	45.00
Chip Board	37.50	@	40.00
Single Manila Lined Chip	47.50	@	52.50
Single White, Patent Coated News Board (Bender)	55.00	@	65.00
Wood Pulp Board	70.00	@	75.00
Binder Boards (Standard Grade)	67.00	@	75.00

Old Papers

(F. o. b. Boston)

Shavings—			
No. 1 Hard White	2.00	@	2.20
No. 1 Soft White	1.75	@	1.90
No. 2 Mixed	.75	@	.80
Solid Ledger Books	1.40	@	1.50
Overissue Ledger Stock	1.15	@	1.30
Mixed Ledgers	.85	@	.90
No. 1 Books, heavy	.60	@	.70
No. 1 Books, light	.50	@	.60
Crumpled Stitchless Book Stock	.50	@	.60
Manila Env. Cuttings	1.60	@	1.70
No. 1 Old Manila	.60	@	.65
White Blank News	1.30	@	1.35
No. 1 Kraft	1.20	@	1.30
Mixed Papers	.25	@	.35
Print Manila	.50	@	.60
Container Manilas	.27½	@	—
Old Newspaper	.27½	@	.30
Overissue News	—	@	.40
Box Board Chips	—	@	.25
Corrugated Boxes	.45	@	.50
Kraft corrugated boxes	1.00	@	1.10
Screening Wrappers	.40	@	.45

Bagging

(F. o. b. Boston)

Manila Rope—			
Foreign	2.40	@	2.[illegible]
Domestic	2.40	@	2.[illegible]
Transmission Rope	1.45	@	1.[illegible]
Jute Rope	2.00	@	2.[illegible]
Jute Carpet Threads	1.00	@	1.[illegible]
Gunny No. 1—			
Foreign	2.00	@	2.[illegible]
Domestic	1.90	@	2.00
Bleachery Burlap	4.00	@	4.[illegible]
Scrap Burlap—			
Foreign	1.90	@	2.00
Domestic	1.75	@	1.90
Scrap Sisal	2.00	@	2.25
Scrap Sisal for Shredding	2.25	@	2.50
Wool Tares, heavy	2.25	@	2.35
New Burlap Cuttings	2.25	@	2.35
Australian Wool Pouches	3.15	@	3.30
Heavy Baling Bagging	2.50	@	2.75
Paper Mill Bagging	1.75	@	2.00
Bagging No. 2	1.25	@	1.50

Domestic Rags (New)

(F. o. b. Boston)

Shirt Cuttings—			
New Light Prints	.01¾	@	.02
New White No. 1	.06¾	@	.07
New White No. 2	.04	@	.04¼
Silesias No. 1	.04¾	@	.05
New Black Silesias	.02½	@	.03
Soft Unbleached	.06¾	@	.07
Blue Cheviot	5.25	@	5.50
Fancy	.02½	@	.02¾
Washable	.0165	@	.0170
Cottons—According to grades—			
Blue Overalls	5.50	@	6.00
New Black, soft	.04	@	.04¾
Khaki Cuttings	.04	@	.04¾
O. D. Khaki	.04	@	.04¼
Corduroy	.01¾	@	.02
New Canvas	—	@	.05
B.V.D. Cuttings	—	@	.06¼

Domestic Rags (Old)

(F. o. b. Boston)

Canvas	.04½	@	—
White No. 1—			
Repacked	—	@	2.75
Miscellaneous	2.50	@	2.75
White No. 2—			
Repacked	1.90	@	2.00
Miscellaneous	2.00	@	2.25
Twos and Blues	1.75	@	2.25
Thirds and Blues—			
Repacked	1.37½	@	1.75
Miscellaneous	1.25	@	1.62½
Black Stockings	3.90	@	4.00
Roofing Stock—			
No. 1	2.00	@	2.05
No. 2	1.80	@	1.90
No. 3	1.50	@	1.60

Foreign Rags

(F. o. b. Boston)

Dark Cottons	1.90	@	2.15
New White Shirt Cuttings	6.50	@	6.75
Dutch Blues	2.25	@	2.50
New Checks & Blues	2.50	@	3.00
Old Fustians	1.90	@	2.00
Old Linsey Garments	2.25	@	2.50
New Silesias	4.75	@	5.25

TORONTO

Paper

(F. o. b. Mill)

Bond—			
No. 1 Sulphite	.11	@	—
No. 2 Sulphite	.08½	@	—
No. 1 Colored	.12	@	—
No. 2 Colored	.09	@	—
Ledgers (sulphite)—			
Ledgers, No. 1	.34½	@	—
Ledgers, No. 2	.25½	@	—
Writing	.09	@	.09½
Book—			
No. 1 M. F. (Carloads)	6.50	@	—
No. 2 M. F. (Carloads)	6.00	@	—
No. 3 M. F. (Carloads)	6.00	@	—
No. 1 S. C. (Carloads)	7.00	@	—
No. 2 S. C. (Carloads)	6.50	@	—
No. 3 S. C. (Carloads)	6.50	@	—
No. 1 Coated and Litho	12.00	@	—
No. 2 Coated and Litho	10.50	@	—
No. 3 Coated and Litho	9.50	@	—
Coated tinted	13.00	@	—
Wrapping—delivered—			
Rag Brown	4.75	@	—
White Wrap	3.50	@	—
"B" Manila	5.25	@	—
No. 1 Manila	5.40	@	—
Fiber	5.40	@	—
Kraft, M. F.	5.90	@	—
Kraft, No. 2	5.40	@	—

(F. o. b. Cars Toronto)

News, per ton—

Rolls (contract)	39.50	@	—
Sheets	44.50	@	—

Pulp

Ground wood	27.00	@	—
Unbleached Sulphite	42.00	@	—
Book (Class 1)	58.00	@	—
Writing (Class 2)	59.00	@	—
Select (Class 3)	60.00	@	—

Old Waste Paper

(In carload lots, f. o. b. Toronto)

Shavings—			
White Env. Cut	2.00	@	2.25
Soft White	1.60	@	1.90
White Blk. News	1.25	@	1.40
Book and Ledger—			
Flat Magazine and Book Stock (old)	.90	@	1.00
Light and Crumpled Book Stock	.80	@	.90
Ledgers and Writings	1.00	@	1.05
Manilas—			
New Manila Cut	1.25	@	1.40
Printed Manilas	.50	@	.60
Kraft	1.00	@	1.60
News and Scrap—			
Strictly Overissue	.55	@	—
Strictly Folded	.50	@	—
No. 1 Mixed Paper	.40	@	—

Domestic Rags

(Price to mills, f. o. b. Toronto)

No. 1 White Shirt Cuttings	.06¼	@	.06½
Fancy Shirt Cuttings	.02¼	@	.02½

PAPER TRADE JOURNAL

ESTABLISHED 1872

SIXTY-FOURTH YEAR

THE INTERNATIONAL WEEKLY OF THE PAPER AND PULP INDUSTRY AND THE PIONEER PUBLICATION IN ITS FIELD

Published Every Thursday by the LOCKWOOD TRADE JOURNAL CO., Inc.

GEO. S. MACDONALD, President — JOSEPH P. HORGAN, Secretary

Published at 34 No. Crystal St., East Stroudsburg, Pa.
Executive and Editorial Offices: 15 West 47th Street, New York
Chicago Office: 123 West Madison St.

TABLE OF CONTENTS

Appoints Sub-Committee on Stream Pollution	13
Great Lakes Paper Sale Appealed	14
Provincial Paper's Earnings Up	14
Paper Box Men to Meet in Convention	14
Wisconsin Paper Mill Activities	15
Paper Mills Oppose Time Change	15
Samuel C. Warner Dead	15
Newsprint Improving in Canada	16
Price Bros. Situation	16
Fraser Companies Earnings Up	16
Restigouche Co.'s Report	16
Committee Chairmen Announced	16
Japan Increases Production	16
Chicago Paper Outlook Bright	18
Reciprocal Trade Agreements	18
Container Earnings Up	18
A. N. Forsythe Passes On	18
Paper and Cordage Men Meet	21
Boston Paper Demand More Active	22
Tomorrow's Money	23
TAPPI Annual Luncheon Speaker Candidate for Vice Presidential Nomination	26
Paper Board Production for December	28
Editorial	**30**
Pulp and Paper Show	31
Fire Damages Merchants Paper Co.	31
Complete Field Work on Pulp	31
Production Ratio Report	31
Government Paper Bids	31
Technical Section	
Pulp and Paper Industry Literature Review	33
Application of Diesel Engines to the Paper Industry	34
Testing of Wood Pulp for Moisture	38
TAPPI Summer Meeting in Canada	41
Delaware Valley TAPPI Discusses Bleaching	42
Construction News	43
Imports of Paper and Paper Stock	45
New York Market Review	**47**
Miscellaneous Markets	**48**
Market Quotations	**48**

THE PAPER TRADE JOURNAL is indexed in Industrial Arts Index

Want and For Sale Advertisements, 54-55

NYCO Products

NYCO LIQUID BLUES

The latest development in fast to light pigment blues for tinting whites • A stable free-flowing liquid color • Brilliant, economical and convenient to use. •

Also

NYCO SUPER BLUES

The ORIGINAL self-dispersing *DRY* pigment blues. • In five standard shades.

These Blues Will Improve Your Whites • In the Beater or on the Coating Mill • Samples or a Demonstration at Your Mill is Yours for the Asking.

NEW YORK COLOR & CHEMICAL CO.

Manufacturers Since 1916

Main Office and Works:
BELLEVILLE, N. J.

Branches:
BOSTON CHICAGO KALAMAZOO PHILA.

A dirty page IN A BRAND NEW MAGAZINE

"SHOW-THROUGH" often spoils a page no matter what is printed on it. It may mar a handsome advertisement or blur the type in a story. When the ink shows through from the opposite side of the sheet, it's bound to look messy.

It would be out of the question for the publisher of a popular magazine to resort to heavier stock to overcome this fault. In a run of several hundred thousand copies, heavy paper would mean excessive costs for material and increased mailing weight.

KREBS
PIGMENTS FOR PAPER

But there is a practical way to avoid "show-through" without extra expense, and without the need for heavier stock. For even the thinnest papers are remarkably opaque if they are made with Krebs Pigments.

You can depend on Krebs fine pigments to give your papers a higher degree of *whiteness, brightness* and *opacity*.

KREBS PIGMENT & COLOR CORP. ... 1007 MARKET STREET, WILMINGTON, DEL.